DECEMBER • 1960

FIREMEN

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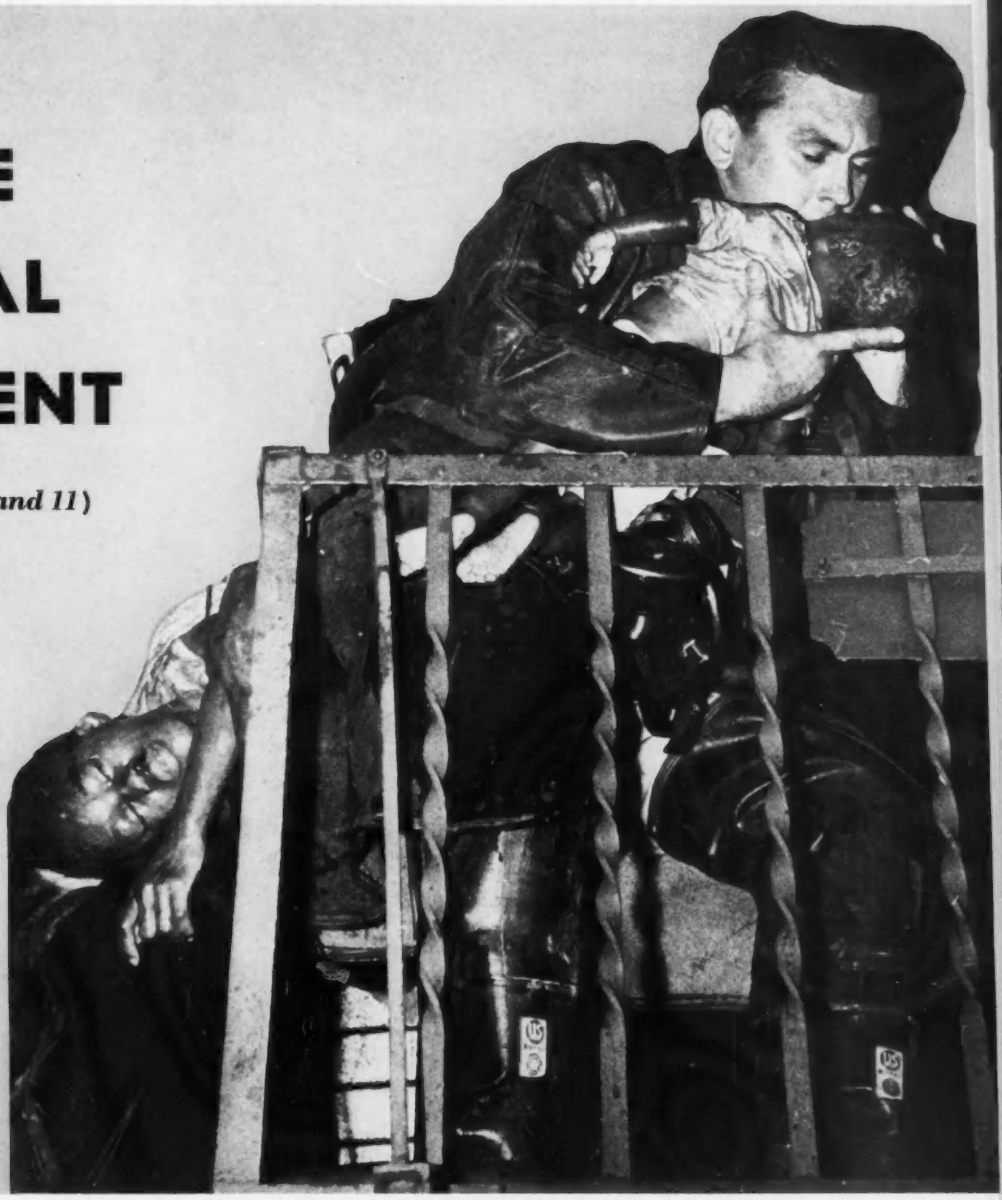
THE VITAL MOMENT

(*See pages 10 and 11*)



ONAL FIRE
TECTION
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65th year

NEW FIRE SCHOOL IN ATLANTA - - - - page 12

BULLETIN ON JET AIRCRAFT - - - - - - - page 19

A HAPPY HOLIDAY SEASON

TO ALL OUR VALUED FRIENDS IN THE FIRE SERVICE

Chief Powhatan

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Select stream by sight or touch — clicks into straight stream or fog — shock absorbing shut-off — no kick-back — rubber bumper.

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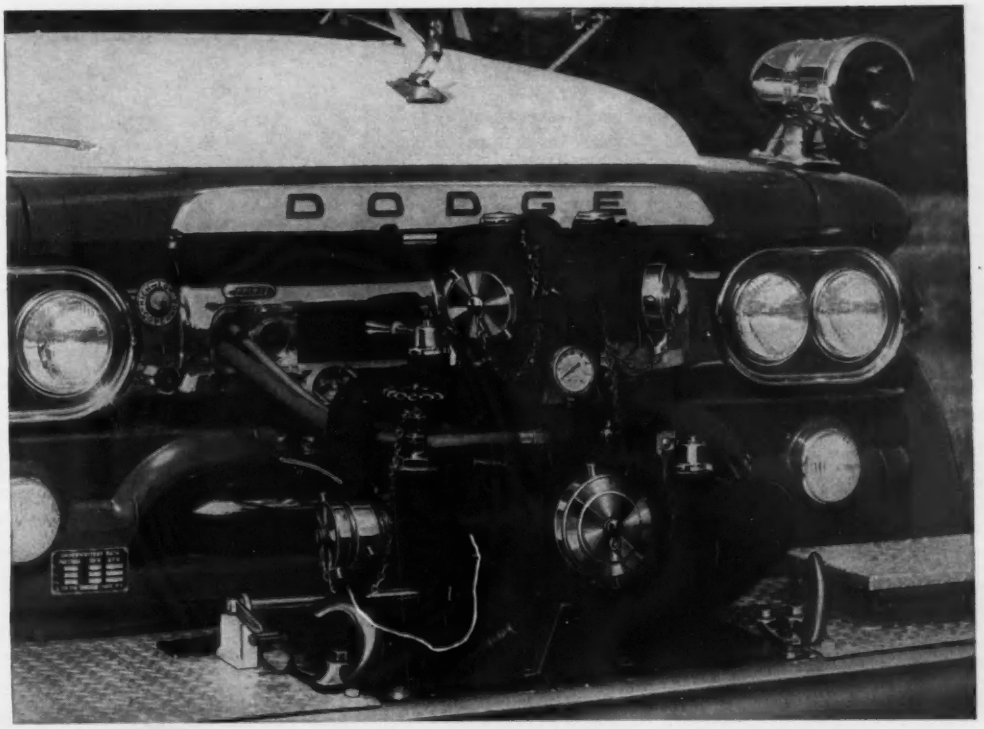

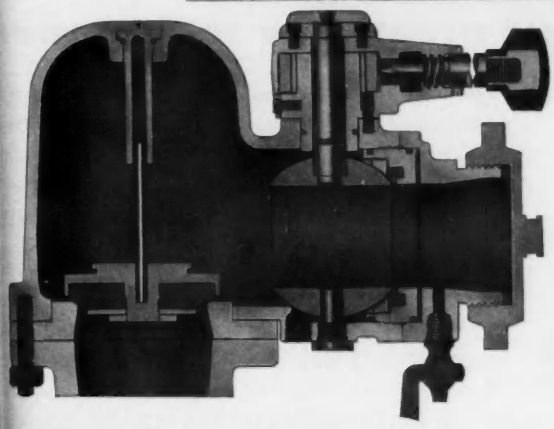

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5. **Check valve eliminates need to close hose lines to prime pump.**
6. **Rugged, heavy-duty construction.**
7. **Modern, smooth appearance.**

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When it's 15° below and ice forms as the water hits, or whenever fire apparatus must face the extreme demands of fire fighting, that's the time to get the full measure of an apparatus' engine performance.

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Model ENF-707C Gasoline. Largest and most powerful of Mack-built Thermodyne fire apparatus engines, this 707 cu. in. powerplant develops 276 hp. High volumetric efficiency is achieved through opposite intake and exhaust porting and Mack's exclusive combustion chamber design.

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Model ENDT-673 Diesel. Already proved in millions of miles on the nation's highways, the famed Mack Thermodyne diesel engine is finding increased interest for fire apparatus where its many advantages make it the ideal powerplant. These advantages include: complete absence of an ignition system with its accompanying spark plug breaker point and coil maintenance complications . . . fuel of lower flash point, hence a safer fuel . . . 24-volt electrical system for quicker, surer starts . . . high torque at low speeds . . . and, for departments where superior fuel economy is important, more work out of less fuel with a diesel engine. Developing 230 hp, the Turbocharged Thermodyne is finding new boosters among fire departments everywhere.

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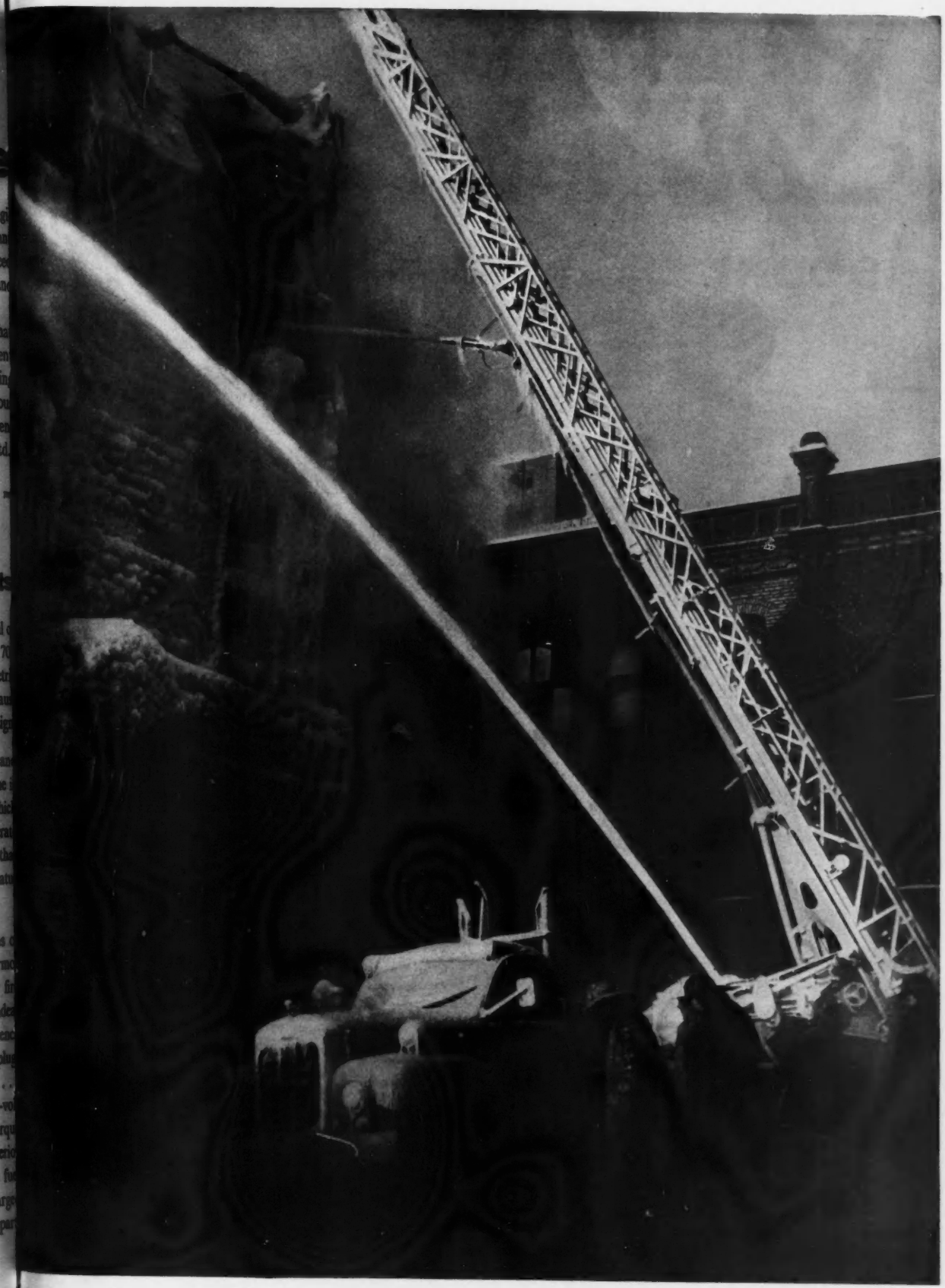

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If you've ever had a nozzle out of action by clogging from scale, sand, or stones — here's your nozzle. Spitz-All clears itself by pressing a button. No shutting down. No changing stream position. A rugged, lightweight, constant gallonage nozzle that works easily in all positions at any pressure.

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1 ✓

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"Fire Fighter's Manuals"

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$14.75

Including:

- NFPA "Inspection Manual" — $4.00
- "Respiratory Hazards of the Fire Service" — $4.25
- "Fire Protection for Chemicals" — $3.00
- "Fire Department Terminology" — $2.00
- "Radiation Control for Fire and Other Emergency Forces" — $4.75

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3. ☐ Fire Station Reference Set

☐ A check for $.....enclosed
☐ Please bill me

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FIREMEN

Volume 27 Number 12

A monthly magazine published for the fire service members of the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

FIREMEN magazine is available only through membership in the NFPA. Complete details on membership can be obtained by writing to the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

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In last month's issue of FIREMEN magazine, the cover picture and an editorial referred to the moments of tension on the fire ground when firemen attempt to save the lives of children. As that issue was being printed, an incident in Newark, New Jersey, crystallized the words of the editorial into vivid reality as fire fighters made the "maximum effort" to save life.

This month's cover is one of a series of excellent photos taken during those vital moments of rescue. The others are on pages 10 and 11. When similar pictures of the rescues were published in the Newark *News* of October 16 they brought immediate public praise for the individual fire fighters and the Newark Fire Department. In addition, the men received plaques from the Dawkins Civic Club of Newark, and the Director of the Newark Fire Department, Honorable James T. Owens, officially commended the men and fire companies who took part in the rescues and fire fighting.

Chief Engineer Fred Waidelick of the Newark Fire Department sent the pictures and information on this fire and rescue incident, which so clearly emphasize the finest tradition of the fire service — the saving of human life.

For those who wonder whether the work load of United States fire departments is becoming lighter with the passing years, an answer can be found in an important fire study, just published. *Fires and Fire Losses Classified, 1959*, appeared in the October, 1960 NFPA *Quarterly* and is now ready in a pamphlet reprint (25 cents).

The 1959 fire loss was the worst recorded in U.S. history, according to this study by the NFPA Fire Record Department. There were approximately 2,114,360 fires of all types in the United States causing a loss of $1,439,640,000, almost 200 million dollars more than the estimated 1958 fire loss of $1,278,808,000. The number of fires jumped more than 120,000 from the 1958 total to 2,114,360 in 1959.

Building fires in the U.S. in 1959 totaled 883,300, up almost 20,000 from the previous year. More than a million other fires involved aircraft, motor vehicles, forests, ships, rubbish, grass, etc. West Coast forest fires were higher, reflected in the $35,220,000 additional loss in the forest figures.

Encouraging was the drop in the number of school fires in 1959, down 200, and school fire loss, $3,891,000 less than the previous year.

Because of the difficult task of gathering and compiling accurate statistics in such a detailed fire study, the figures for the 1960 fire year will not be available for some time. Indications are, however, that fire losses for this year now ending will be just as bad or worse than 1959.

Frequently, NFPA member fire departments write to ask that subscriptions to FIREMEN magazine be added to their membership account *during* the membership year. Unfortunately, this cannot be done. Subscriptions to the magazine can only be ordered when a fire department joins NFPA and renews membership.

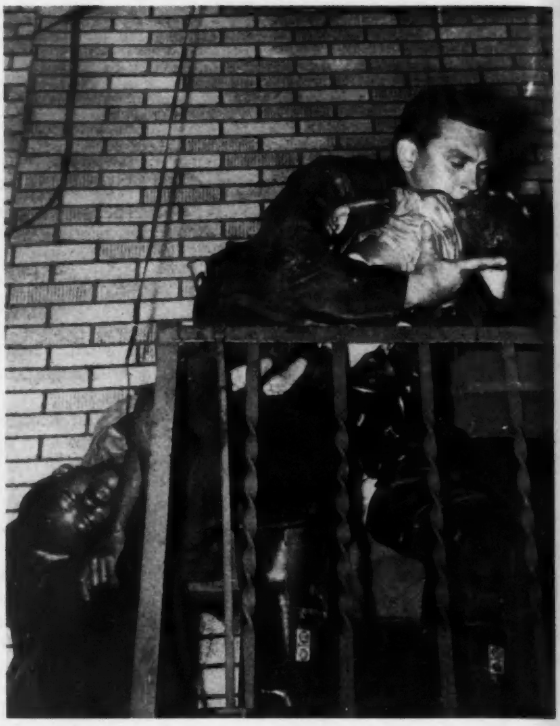
This is something to remember. A majority of fire departments order or renew membership between January and May each year. A great many officers and fire fighters would like to receive the magazine, but the only way they can get a subscription is through NFPA membership. They either purchase individual associate membership for themselves, or they order the magazine through their fire chiefs' or fire department's NFPA membership. Otherwise they cannot subscribe to the magazine.

So, if you as chief, or your fire department, are due to renew membership in the Association in the next few months, ask the men now if they want to subscribe to FIREMEN. Then when you receive your membership renewal notice, simply send in the list of names to be added to your membership account. Your men will appreciate this and we are sure that you will notice an increase in their enthusiasm and interest in your fire department's operations.

WARREN Y. KIMBALL, Managing Editor; PAUL R. LYONS, Editor; HENRY S. GERE, Advertising Manager; ROWENA D. DORES, Editorial Assistant; SHIRLEY TOBEY, Fire Service Department; VIRGINIA STILES, Advertising Department.

THE VITAL MOMENT

Photos supplied by Chief Engineer Fred Waidelick, Newark Fire Department



2. **"Don't stop to think! Cover the nose and mouth with your own! Breathe! But don't burst those little lungs!"**

Fireman Kossup standing, Captain Marron moving down.

1. **"God, it's a long way down there! Should I wait here and continue mouth-to-mouth?"**

Fireman Stanley Kossup at left, Captain Robert Marron at right.

AT 9:28 P.M., on October 15, the Newark, New Jersey, Fire Department, commanded by Chief Engineer Fred Waidelick, received an alarm for a fire in a 3-story frame dwelling. When first companies pulled up to the building, smoke and flame were coming out of the entrance hallway on the first floor and the second floor windows. Just as the men moved lines for attack, someone called that children were trapped on the third floor.

Captain Robert F. Marron of Engine Company 20, Firemen Stanley Kossup and John Denvir, both of Truck Company 3, and Acting Captain William Olvaney of Engine Company 6 donned masks and went into the building. Olvaney pulled a booster line with him since the smoke and heat were intense.

Kossup and Denvir found five children lying on a bedroom floor of the third floor apartment. They passed them to Marron who handed them to Olvaney on the fire escape. Other fire fighters, coming up, helped take some of the youngsters to the street.

Three of the children were 9 years, 5 years, and 22 months old, and there was also a pair of twins

3. **"Should I keep this up? Can we waste a moment or two and switch to oxygen?"**

Fireman Kossup.

4. **"What do you think? Is she going to come out of it? Did I do it right?"**

Fireman Kossup at right.

months old. Kossup and another fireman, Robert Dunbar, started mouth-to-mouth resuscitation on two of the youngsters. The exceptional photos on these pages show only Kossup's efforts. All youngsters recovered after receiving oxygen and medical aid.

The techniques of mouth-to-mouth resuscitation were adopted by the American Red Cross and by the fire service after years of trial and research. Actually, in 1951, a modification of the method was described for use on small children, to lessen chances of injury to the chest wall that could be inflicted by the pressure method of manual resuscitation.

In 1957 the technique was officially adopted for application to infants and in 1959 it was adopted for adults. Since then, many spectacular rescues have been attributed to the method.

As firemen know, when the technique is applied to infants, the rescuer's mouth should seal the infant's nose and mouth. The rescuer should breathe gently at about 20 cycles per minute. Prior to application, the child's tongue should be freed and the head tilted back.

After that it's up to *you!*

5. ***TRADITION*** **Other men spend their lives developing and contemplating their codes of ethics. Firemen simply live theirs.**

Left to right, Fireman William Olvaney, Captain Robert Marron, Fireman Stanley Kossup, and Fireman John Denvir.

New training center of Atlanta, Georgia, Fire Department with laboratory building at left, drill tower at right center and office building at extreme right. *(Photos by Atlanta Fire Department.)*

NEW FIRE SCHOOL IN ATLANTA

THE fire department in Atlanta, Georgia, recently opened a new, well-planned training center. Built for $173,000 with the funds provided by a bond issue, the training center covers an acre and a half at Claire Drive and Pryor Road. It will serve the 738 officers and men in the department and, as reported last month, will also be used in conjunction with the Georgia State Training Program.

The city of Atlanta has about a half million population in an area of about 130 square miles. There are 30 engine companies, 14 ladder companies, an airport fire company and a floodlight company in the department. As reported last month, Atlanta was saddened by the death of Chief L. Waits Guthrie, who died while the department was still in the process of an expansion program. He was succeeded by Chief C. H. Hildebrand, Jr. Chief of Training Raymond W. McGill provided information on the training center.

The new facilities include a fire laboratory building, a drill tower, a cistern, tanks for flammable liquid fires and an administration building, all on a paved area which provides ample space for movement of apparatus. Designed by architects Thompson, Hancock & Hackworth of Atlanta, and built by Modernization Construction Companies, the training facilities were completed for the following costs:

Fire Laboratory	$23,500
Protective Insulation for Laboratory	11,000
Thermo-coupling Units	320
Fire Training Tower	39,974
Cistern	9,400
Square Tank	536
Round Tank	470
Office and Training Building	66,450
Grading and Paving	20,000

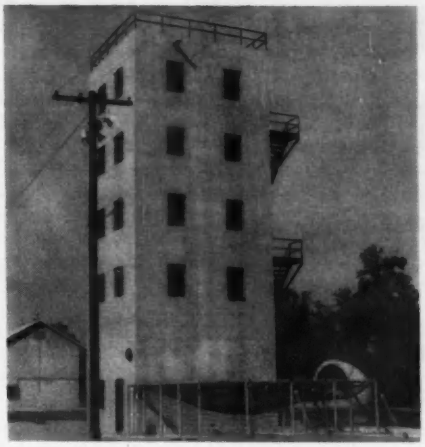
The fire laboratory building is designed to simulate a variety of fire conditions. It is constructed of reinforced concrete which features an expanded slag aggregate, high resistance to heat, and provides considerable insulation for the reinforcing steel. In all rooms, except the stairs, a 2½-inch coating of fire-resistive cement with the same aggregate was applied, held in place with "shot" studs wired to heavy mesh. This interior coating is designed to withstand heat up to 2,500 degrees F. for approximately one hour.

Each window and door opening is covered with a hinged "Class A" metal fire shutter to control heat, smoke and draft. To provide the best draft control, each floor has a grilled opening with a solid metal covering; the attic has roof ventilators and an adjustable louver with a roof scuttle. The floor openings also serve as drains, with a large drain provided in the basement. Each window opening has a different type of sash to familiarize trainees with the various types of windows they will encounter in buildings in Atlanta.

Thermocouples are in each room, and the temperatures are recorded on a panel board on the exterior of the building. Interior stairways are enclosed, and an emergency exit is provided in the basement. Surrounding this building for approximately 30 feet in all directions is a concrete pad designed to protect the asphalt paving from heavy equipment, heat and water streams.

The five-story reinforced concrete drill or training tower is 22 feet square and 62½ feet high. A metal railing surrounds the roof to simulate a parapet wall. Each window opening has a steel channel and each door opening has a steel frame. The exterior of the tower was covered with a thin coating of hard and durable cement.

The drill tower is also equipped with a complete sprinkler and standpipe system used for controlling small fires inside the building and also for training op-



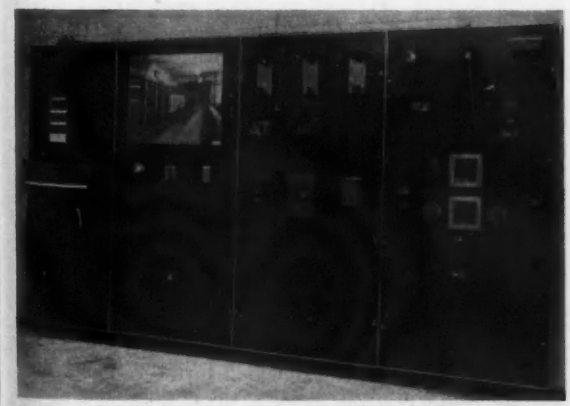
Atlanta's drill tower. Note floodlights on telephone poles.

erations with this equipment. Steel fire escape stairs are on the outside and concrete stairs inside. These interior stairs are enclosed in the first two floors to provide realistic hose training obstacles.

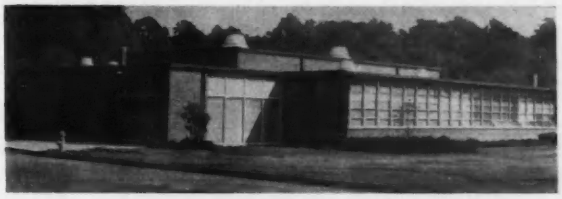
Different types of windows are installed on one side of the tower to provide a variety in forcible entry operation. A steel net frame is on one side of the tower which is used for pompier, ladder and rope slide drills. This tower also is surrounded by a concrete pad for approximately 30 feet in all directions away from the tower.

The cistern used for drafting operations is 22 feet square and 15 feet high. It has a baffle dome with a return basin so that water may be used again and again. Two deck guns are mounted permanently for testing nozzles and for general practice with this equipment. There is also a dummy fire hydrant and standpipe siamese connections to provide practice for connecting pumpers to this equipment. The cistern holds approximately 45,000 gallons of water and is arranged so that three pumpers can operate simultaneously.

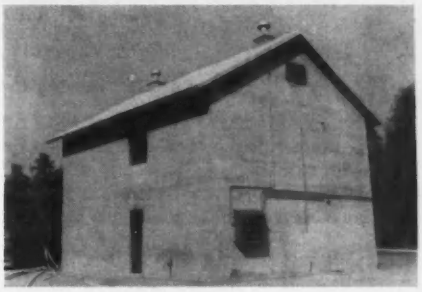
The square and round tanks used for flammable liquid fires are also on a concrete pad approximately 20 feet wide by 35 feet long. Both tanks have a draining system to remove water, foam and other liquids. Each tank features a 6-inch wall of the same heat resistant reinforced concrete used in the laboratory building. Each tank has a "boiler-plate" lining. The 5-foot square tank is 4 feet high, and the round tank is 10 feet in diameter, 6 feet high.



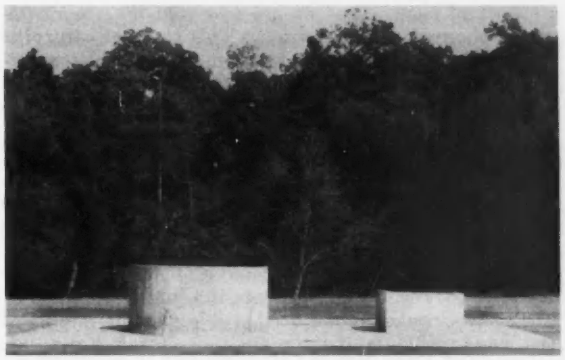
This modern ADT signaling system is installed in the auditorium of the training and office building.



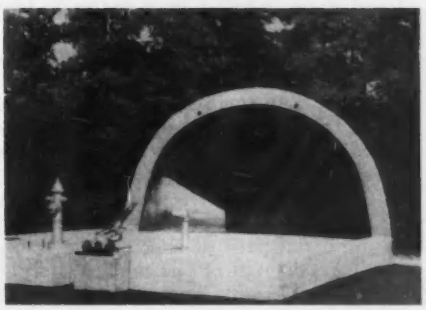
Training and office building.



Fire laboratory building showing panel board for thermocouples. Note louvered window at upper right.



Flammable liquid tanks built of reinforced concrete rest on concrete pad.



Cistern showing baffle, dummy hydrant and standpipe connections and permanent deck gun.

The training and office building features a foyer, rest rooms, locker room, auditorium, classroom, storage room, training offices and kitchen. This building includes 5,920 square feet of floor space and is constructed of red brick and concrete block. Walls are covered by a plastic finish of high durability. Doors between the classroom and auditorium can be opened so that both rooms can be used for a capacity group, or an acoustic partition can divide the area into two classrooms.

HOW TO IDENTIFY FIRE CAUSES

(Since this article has been so popular with our readers, the three installments are being combined in a single reprint at 50c per copy with discounts for quantities.)

From a talk "Recognizing Where Arson Exists" by Chief Investigator C. W. Stickney of the Portland, Oregon, Fire Department, given at the Fire Service Command School in Yakima, Washington

Part III, Conclusion of a series

FIRES are occasionally caused by electric blankets (about 40 to 60 per year in Portland). The cause of these fires can invariably be attributed to misuse — covering with blankets or other material, rumpling, improper cleaning, breakdown of extension cord near blanket, etc.

Most of these blankets are operated by a main bi-metal thermal control switch. This thermal control is activated by room temperatures and not by the temperature of the blanket. In addition to this, there are three bi-metal thermal controls located in the edge of each blanket; and in double blankets there are three additional controls running down the center of the blanket. These blanket controls or thermostats are sealed in a plastic sack. They are not designed for continuous operation, and only act in event the blanket becomes overheated — in which case they cut off the entire grid.

Since these controls are located along the edge of the blanket, they would not operate if a pile of blankets or some such insulating material was left in the middle of the blanket. Then, if the main control switch was left on "High" in a cool room, the current would remain on no matter how hot the covered section of the blanket might get. The same thing occurs when any objects are placed on the blanket with the main switch on. Even dogs on the bed have caused blankets to get quite hot before Rover suspected something was wrong and moved. Doubling over the center section of a blanket will more than double the heat. Blankets have been known to cause fire when the foot of the blanket was tucked between the mattress and padded box spring.

When a fire starts on the surface of the bed it is difficult to tell whether it was caused from the electric blanket or a cigarette, unless the fire was caught fairly early and the path of char can be traced. There will usually be enough of the main switch left to indicate whether it was on. Even though switch is in "OFF" position, if the cord is plugged into wall outlet the bi-metal thermal control points of main switch should be checked for sticking or fusing.

Cigarette Fires

A cigarette at the surface of the burning tobacco, without draft, has a temperature of about 550 degrees F.; with draft, 800 degrees F. Insulated as it would be after burning into a mass of combustible material, the temperature is about 950 degrees F. A cigarette will burn for 15 to 25 minutes.

With this low surface temperature, a cigarette lying on a smooth-surfaced board with only a small portion of the burning coal touching the surface has little chance of doing more than char the surface. The same usually occurs when a cigarette burns on a flat *thin* surface of more combustible materials such as paper or cotton. A cigarette will usually burn out even when completely covered with very light, loose material, such as cotton cheesecloth, since the heat is dissipated through the loose cloth and does not build up to ignition temperatures.

To cause flaming combustion a cigarette requires a fairly good insulation. Dropped on upholstered furniture, it usually rolls in between cushions and arm or back rest. After burrowing in and finding insulation, the temperature will rise to about 900 degrees F. This action is slow, and flaming combustion of the furniture usually will not start for at least 1½ hours. The first 45 minutes usually results in a smoldering area of about 6 in. to 8 in. in diameter. When furniture has been 30 to 70 per cent destroyed by a cigarette fire the coil springs of the cushions, and often the main springs, will be heated to a degree which causes them to anneal and collapse of their own weight. A temperature of about 1,150 degrees F. or above is required to make furniture springs collapse of their own weight. After a fire is extinguished, springs are seldom annealed or soft. They are usually much harder than normal, even though collapsed, due to the rapid quenching or cooling action of the fire streams. If springs should be found in an annealed condition after a fire it would only indicate that the temperature of the springs rose to above 800 degrees F. and then slowly cooled. It may be possible to gain some idea of the temperature of the fire by running a Brinnell or Rockwell hardness test on the involved springs. During controlled tests it was noted that the cigarette fire usually burrowed in between the padding of the coil springs and then smoldered from the inside until the padding was reduced to ash. This smoldering was found to continue for as much as three hours; and thermocouples in the cushions indicated the heat ran from 1,400 to 1,600 degrees F.

Where fire from other sources in the room burn upholstered furniture to the same extent (30 to 70 per cent) the padding is burned from the surface in, and the temperature around the springs usually does not run high enough or long enough to cause their collapse. Tests with crumpled papers burned on upholstered furniture also failed to collapse the springs — as did tests with up to one quart of gasoline. This type of fire burning on the surface of padded furniture has a high enough temperature to collapse the springs, but as the heat is mostly on the top of the spring it does not affect the main body. Also, springs are ideally designed for

dissipation of heat applied to one end only. Large quantities of flammable liquids on upholstered furniture will soak in and create high enough temperatures around the body of the spring to cause collapsing if allowed to burn long enough. In actual fires in protected areas this seldom happens, since a flammable liquid fire will usually flare up with intense heat and break the windows in one to two minutes. It is usually discovered, reported and extinguished with a total burning time of only 10 to 20 minutes, which is not long enough to heat the springs to the collapsing temperature. Flammable liquids or any other burning material on the floor beneath the springs will usually cause them to collapse, since the heat will bank up under the top padding and the temperature will rise rapidly.

If the furniture is completely destroyed by fire, or if the building is burned to the extent that structural members have dropped on the furniture, then the collapsed springs would not necessarily indicate a cigarette in the furniture.

Indications of a cigarette in furniture or mattress would be:

Heavy charring of the unit and the floor, and immediate surrounding area.

Char pattern on furniture frames, heaviest on inside.

Heavy staining and blackening of mirrors and window glass in this area, indicating a long, slow fire — a burning time of at least 1½ hours and up to 3 or 4 hours.

Collapsing of part or all of the coil springs.

Cigarettes will ignite foam rubber padding to about the same degree as other padding. Lying flat on the surface they will usually char a small hole and burn out. If the cigarette is partially covered at the sides or bottom, a fire usually results in an hour or so. With foam rubber padding, fire will occur a little faster since smoldering in foam rubber reaches its ignition temperature faster and burns with greater intensity.

Spontaneous Heating and Ignition

There are few fundamental causes of spontaneous heating, but the conditions under which these factors may operate are numerous. Nearly all organic materials and many metals are subject to either oxidation or fermentation, or both; and, therefore, have some potential to spontaneous heating. It is produced in three major ways; by:

Chemical Action,
Fermentation — and the most common,
Oxidation

Examples of chemical action are unslaked lime and water, or sodium and water. Fermentation heating is caused by bacterial action. In this, moisture is a prime factor. The most dangerous materials are those which are subject to combinations such as fermentation and oxidation with drying. Fresh sawdust over 10 feet deep is subject to fermentation heating, but rarely reaches ignition temperature. In oxidation heating, rapid oxidation must take place, combined with a good insulating factor and an oxygen supply. Oxidation results in oils containing carbon, hydrogen and oxygen. This combination is mostly found in vegetable and fish oils; and, to some extent, in animal oils.

The susceptibility to spontaneous heating is usually determined by the drying time factor. Unadulterated hydrocarbons, such as mineral and petroleum oils, are not considered subject to spontaneous ignition.

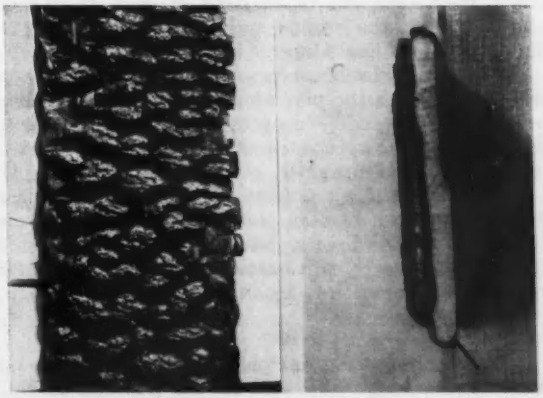
Spontaneous ignition is a rather rare occurrence in residential or small business buildings. It is considerably accelerated by external heat such as sunshine, steampipes, hot air ducts, or friction within the organic mass due to wind action or vibration.

Spontaneous ignition has always been a rather mysterious fire cause, due to the numerous unknown factors and combinations that may be involved in the action. Because of this, it has often been used as a "catch-all" fire cause. By careful investigation of all of our so-called "Spontaneous Ignition" fires in Portland, we found that about three-fourths of them were not caused by spontaneous ignition.

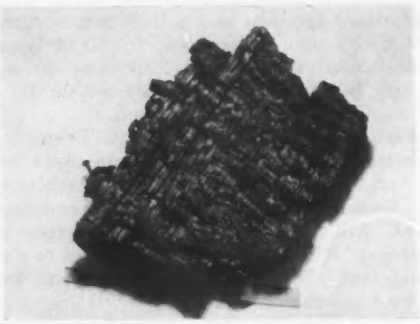
The usual time required to produce spontaneous ignition by oxidation or fermentation runs from several hours to several days, or months. This form of ignition is characterized by internal charring of a mass of combustibles, and some of the remains of this material will usually be found at the point of origin (if the fire fighters have been careful and especially if fog was used) since it normally takes a considerable mass — several inches in depth of a fairly dense material — to create the factors necessary for spontaneous heating. Sometimes when material of this type is suspected (such as oily meals) and is found to be deeply charred all the way through the mass, you may satisfy yourself that the fire, or external heat, was not responsible for this by checking for depth of charring of other meals of the same type in the same vicinity and subject to the same heat. When not heated internally, sacks of various meals, flour, etc., will normally survive an extensive building fire with only an inch or two of charring on the exposed surface and with no damage to the interior.

Dust and polishing mops have often been accused of causing spontaneous ignition, and probably have in some rare cases. It is debatable whether the average mop would have enough bulk to provide the necessary insulation to raise the temperature to the ignition point; although with favorable conditions — such as a large mop, saturated with fast-drying oils, pressed in a corner with other brooms, and receiving outside heat from a steampipe or the sun's rays through a window — ignition could occur.

During the several hours required for spontaneous heating to build up to the ignition temperature the mass of material undergoing the heating will be giving off a large volume of very acrid odors — especially linseed and similar oils. Persons in this area during the several hours prior to the fire would, normally, be aware of these odors.



Large rolling blisters indicate rapid, intense heat. Sharp line of demarcation between charred and uncharred wood at right corroborates this.



Flat, baked appearance with many fire craze lines indicates a very long, low heat. Cross section showing charring throughout corroborates this. This fire was caused from uninsulated high pressure steampipes (120 pounds).

More often than not, the cause of fires originating near a mop in a closet or on a back porch is little Junior playing with fire.

The days of "hot ashes" as an ignition source are returning. Hard fuel heating with its ash problem has largely been eliminated; but now we are having an increasing number of fires from barbecue briquets. These charcoal briquets are very susceptible to spontaneous heating when fresh or moistened. They have caused several fires in boxcar shipments and warehouses, where large piles are stored. In the small quantities found in the average household, however, they build up to ignition temperature only when a number of favorable conditions exist simultaneously, such as when briquets have absorbed moisture, have been pulverized or broken into smaller pieces, and have been subjected to outside heat such as the sun's rays. Even then, an insulating cover of papers or blankets would probably be required to hold in the heat. In small quantities, the voids in the pile caused by the shape of the briquets usually allow sufficient ventilation to prevent any dangerous heat rise.

We have, however, had a number of supposed spontaneous ignition fires in barbecue briquets which, on investigation, turned out to be a "hot ashes" situation. In some instances an accumulation of barbecue ashes, thought to be cold, had been placed in cardboard boxes or garbage cans. These containers later burned, transmitting fire to nearby combustible walls, floors and fences.

Other fires have been caused by attempts to save briquets by spraying or sprinkling them with water. When they appeared to be dead or cold, they were placed back in the briquet sack, only to break out in fire one to three hours later.

Hot coals in piles of ashes will often hold fire for several days. When the pile is moved, the coals — being heavier than the ash — drop to the bottom or sides of the container where they ignite the container or material against the container.

In industries using polyester resins and fiberglass coatings there is a spontaneous heating hazard if cobalt driers are mixed directly with the organic peroxide catalysts. However, this heating occurs instantly and would usually be noticed by the occupants.

Glass

Glass is composed principally of silicon and lime. Window glass, especially that at the point of origin, can give many indications of the manner of burning.

In checking the pieces of broken-out windows, if the glass is clear and in irregular, blocky-shaped pieces, it indicates a rapid intense buildup of heat of about 1 to 5 minutes. If the pieces are heavily "crazed" but with little or no stain, it would indicate an intense heat with a slower buildup. Heavy staining with no crazing would indicate a slowly built-up fire with considerable smoke; half-moon checks on the stained side indicate the glass was still in the frame during fire and drops of water spattered on it.

If glass is on the inside of the building and is clear and in rather long rectangular pieces, it indicates the glass was broken by some force other than heat prior to the fire — perhaps a forced entry. Window glass broken by a blow from a hard object will have several radial cracks running out from the point of impact and concentric cracks running around the point of impact. This causes the glass near the break to come out in rectangular- or triangular-shaped pieces. If unstained or heat-checked pieces, shaped as from thermal cracking, are found next to the floor at the bottom of the debris, while other glass in the same area is stained and heat-checked, the unstained glass was probably broken by some intense heat early in the fire.

Thermal cracks in glass run helter-skelter and form odd-shaped pieces. Glass near a high-intensity explosive, such as dynamite, will usually be broken into slender slivers. If glass is broken from low-intensity explosives — as from dust or gas — the pieces will usually be in chunks.

Glass will soften at from 1,200 to 1,400 degrees F. and will become molten and runny at 1,600 degrees F. or above. The corners of broken glass will round off between 1,100 degrees and 1,200 degrees F. and would indicate it was still in the window when this temperature was reached.

Glass objects stain easily from heat and smoke and are often unsalvageable. All glass and metal containers have trademark stamps on the base. Glass trademarks indicate the manufacturing company's trademark and mold number. From this the company can give information as to original use of container and to whom it was supplied.

Heat colors will be found in most chromium or shiny metal surfaces subjected to heat, such as light fixtures, toasters and irons. These colors often indicate the temperatures at different locations and the progress of the fire, and they are fairly accurate for most types of shiny metal.

Heat Colors of Metal at Various Temperatures

Yellow	450° F.	Full Cherry	1,400° F.
Brown to Purple	550° F.	Salmon	1,600° F.
Blue	600° F.	Lemon	1,800° F.
Faint Red	900° F.	White	2,200° F.
Dark Cherry	1,100° F.	Sparkling White	2,400° F.

The lighter or higher temperature colors will not remain in the metal after cooling, but they may be indicated by circles of the darker colors.

The length of time of free burning or flaming combustion against various wood surfaces in the building may be determined fairly accurately by the char depth. Tests by the Forest Products Laboratory indicate most woods will char at the rate of 1 inch in 40 to 45 minutes when exposed to average flaming temperatures of 1,400 to 1,600 degrees F. If both broad surfaces are equally exposed the char rate should be doubled.

These tests should not be confused with Underwriters' fire resistance ratings. For example, the UL fire resistance rating for a 1⅝ in. tongue and groove pine wall is given as 12 minutes at 1,400 to 1,700 degrees F. It evidently is felt that longer exposure may

Point of origin of an arson fire where magnesium foam rubber and rubber solvent were used as accelerants. Telephone bell (not shown) at floor level was igniter. Note rolling blisters, melting of steel channel pipe and burrowing or charring under baseboard and quarter round.

A distinct pattern of the flammable liquids remains on this wool rug after it was removed from the scene of the fire, dried and swept clean.

transmit sufficient heat through the boards or the joints to cause fire beyond the wall. However, it would require about 1 hour and 5 minutes to *char* completely through the wall at these temperatures with only one side exposed.

Demarcation lines between charred and uncharred material are also useful in determining the type of heat involved. For instance, if charred boards near the point of origin are chopped or sawed through they will show a sharp and distinct line between charred and uncharred wood if it was a fast, intense fire extinguished in the normal time. A long, slow fire will show a graduation of char and a flat, baked appearance throughout.

Automobiles burned by a fast, intense fire that was quickly extinguished will show a sharp line between charred and uncharred paint. This same condition will be noticed on the paint of buildings around windows, doors, and other openings when subjected to a fast fire. A slow building fire will show heat and smoke stains on siding, under eaves and around windows where there was smoke seepage. Variations of this may also be noted in other common materials, such as plastics.

Flammable Liquids

A successful and destructive fire is not nearly as easy to accomplish as many people assume — especially in populous areas where fires that might in time become damaging are discovered and reported while in the early stages. Many fire-setters, after trying other materials, devices and painstaking methods with little or no results, have become frustrated and turned to flammable liquids with a vengeance — sometimes literally soaking themselves along with the premises in a frenzied effort to be certain — occasionally with disastrous results to the fire-setter.

Two years ago a psychopath on a fire-setting spree in Portland set 24 fires in a six-week period. Of 22 fires started with crumpled newspapers, 20 went out or burned so slowly they were discovered and put out with only minor damage. Only 2 of the 22 caused heavy damage. The other 2 fires were started with flammable liquid, and both caused heavy damage. He now has ten years to consider the error in his methods.

Persons using flammable liquids occasionally use delayed igniting devices. This is good for the investigator since most of the time parts of these fuses, candles and clocks will remain unburned at the point of origin.

Low-flash point flammable liquids are fast. Two quarts of gasoline ignited in a first floor room can completely involve a 2-story frame dwelling in as little as 10 minutes. Because of this fast-burning characteristic, the premises may have a flash-over appearance, with walls and ceiling charred evenly and to about the same depth as in the room of fire's origin. Heat-broken window glass will have little or no stain, and little or no crazing. A fast-rising intense heat on exposed wood surfaces will cause deep, rolling "alligatoring" with rather shiny, smooth blisters.

Since flammable liquids (like water) will run to the lowest level, the path of heat travel will be from the floor up and the charring on the bottom of furniture, ledges, and shelves will be as deep as, or deeper than, the charring on the top sides.

After the fire the floor should be cleaned carefully since many signs may be found here; such as a charred, ink-blob outline of the flammable liquids thrown on the floor. Very often a wool rug that appears charred all over will — when dried out and then swept hard with a stiff broom — show a distinct pattern of the flammable liquids. This is because the liquid is absorbed into the nap of the rug and burns more heavily there than in the areas where there was no flammable liquid. Flammable liquid will usually soak into the joints of wooden flooring and, as a result, the joints will often be heavily burned out.

Check the mopboards, quarter rounds and sills. Flammable liquid often runs under and chars the bottom of these items, and this condition would not be likely to occur in Class I fires.

Check the corners of the room. Few floors are perfectly level, and flammable liquid will often run into and burn out the corners; whereas in Class I fires the dead-air corners at floor level are usually the least damaged.

If deep, rounded holes with nearly vertical side walls are burned in floor, this is an indication of heavy oil dripping and soaking into the same spot on the floor over a long period of time — such as from sewing machines or other stationary machinery.

Check the depth of floor charring against the ceiling. If floor is charred as much as, or more than, the ceiling this indicates a flammable material directly at floor level since, in the average fire, the floor temperature is only about one-third that of the ceiling.

When you find a heavy charring in or through the floor without "fingers" or a runny appearance, check for the possibility of foam rubber cushions or rug pads

(*Continued on page 32*)

Old style overcoat at left; new finger-tip length at right for all ranks below Battalion Chief.

Old style uniform with bulky coat worn by lieutenant at left. Captain at right has new, lightweight uniform worn by all ranks.

Short-sleeved shirt is worn in summer months by fire inspectors.

NEW UNIFORMS IN MILWAUKEE

A report from the Milwaukee, Wisconsin, Fire Department

THE "new look" has come to the Milwaukee Fire Department! Firemen these days are seen in attractive, lighter weight uniforms and comfortable, streamlined overcoats.

Until the recent decision to change to the new style, almost thirty years had passed without a major alteration in uniform design. It was becoming increasingly evident that a change was necessary. The uniform coat, or "short coat," was too bulky to be worn under the overcoat and too warm to be worn comfortably indoors. When remaining inside for any length of time, it was necessary for firemen to remove the short coat and appear in shirt sleeves.

The overcoat was an awkward, cumbersome knee length and, like the short coat, of the double-breasted type. Both garments were worn by all uniformed ranks except Deputy Chiefs, who wore a black navy-type belted topcoat (optional for Battalion Chiefs).

One of the first acts of Chief of Department Edward B. McCabe, appointed in the fall of 1959, was to form seven committees, directly responsible to the Chief, to consider problems and developments in various areas of department operation. One of these, the Personnel Committee, was also given the task of surveying and studying the uniform problem and recommending appropriate changes, if necessary. This committee is under the chairmanship of Assistant Chief Louis W. Hoeft, and includes among its members a Deputy Chief, four Battalion Chiefs, a Fire Lieutenant (representing the local Association of Firefighters) and the Secretary of the Department as administrative advisor.

The Personnel Committee immediately set to work consulting with uniform vendors and manufacturers, and with other fire departments, as well as seeking the opinions and reactions of Milwaukee firemen themselves. A questionnaire was directed throughout the department on the type of overcoat desired, with the response overwhelmingly in favor of a finger-tip length, reefer type coat. The committee also found that a great deal of helpful preliminary research had been done earlier by the Chicago Fire Department in its quest for a new type of uniform. Several months of intensive work by the committee resulted in a number of important recommendations which were subsequently approved by Chief McCabe.

The new uniform ultimately adopted for all ranks of the Milwaukee Fire Department consists of a single-breasted, four button coat having four sewed down patch pockets (with another button on each pocket), and with matching trousers. This uniform is similar in type to that worn by members of the Chicago Fire Department, but without epaulets. The cloth is of 14-ounce true color blue serge, which has been approved by the U. S. Testing Laboratory for color, texture and wearability. Ranks up to Battalion Chief wear the silver "City of Milwaukee" buttons; Battalion Chiefs and above wear the gold buttons.

The overcoat adopted for all ranks below Battalion Chief is a finger-tip length double-breasted reefer type coat of 19-ounce wool whipcord with a full rayon heavy twill lining. It can be worn comfortably over the new uniform. This coat, designed to the committee's specifications, has a collar considerably narrower than usual on coats of this type. Adoption of a blue navy-type belted topcoat for chief officers was recommended by the committee. These are being manufactured to department specifications.

In addition, colorful red and white Maltese Cross shoulder patches are being worn by Milwaukee firemen for the first time. These are placed on the left sleeve of the uniform and overcoat and are nylon embroidered with the words, "Milwaukee Fire Dept." and a hydrant and hook and ladder design. A similar shoulder patch in cotton embroidery is worn on the dress shirt.

No change in uniform caps was proposed, except that a design in gold braid or "scrambled eggs" was added to the cap visors of the five Deputy Chiefs. All chief

(*Continued on page 27*)

National Fire Protection Association
INTERNATIONAL

COMMITTEE ON AVIATION

60 Batterymarch Street Boston 10, Mass.
Telephone: HUbbard 2-1630

To promote aviation fire safety to life and property during the operation, maintenance, servicing and storage of aircraft, in the operation of airports and incidental functions. The Executive Division establishes policies and supervises the operation of the several Sectional Committees organized to handle specific technical problems.

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NATIONAL FIRE PROTECTION ASSOCIATION

A voluntary membership organization to promote the science and improve the methods of fire protection. The Committee on Aviation is one of the Technical Committees organized to further the objectives of the Association. Personnel of the Committee is selected to have balanced representation from the aircraft industry (including aircraft manufacturers, civil and military aircraft operators, airport management), the aviation regulatory authorities, the fire service, aviation insurers, and fire protection engineers.

October 1960

Aviation Bulletin No. 257

New Aircraft Rescue and Fire Fighting Problems with Jet and Turbo-Prop Aircraft

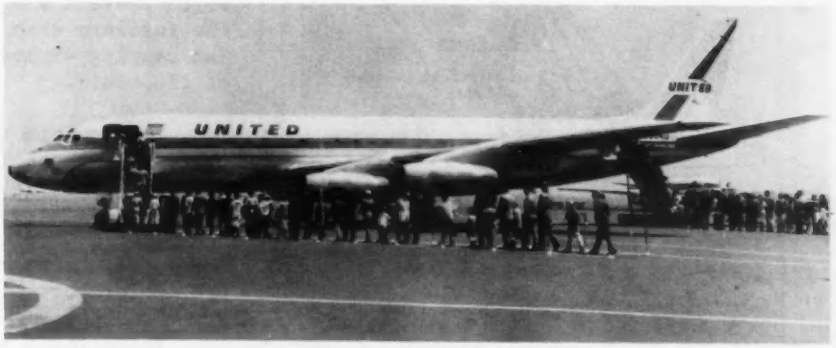
Explanatory Note

This Bulletin has been prepared by Mr. N. L. Christoffel, a member of the NFPA Committee on Aviation and Staff Superintendent, Safety, United Air Lines for the information and guidance of all concerned with this subject. Readers are invited to submit comments or suggestions on the scope of this Bulletin to the Committee Secretary.

The advent of the new types of jet and turbo-prop aircraft in recent years is presenting some new and unusual problems in aircraft fire fighting. Listed in this Bulletin are most of the more predominant items, and the best methods of surmounting them.

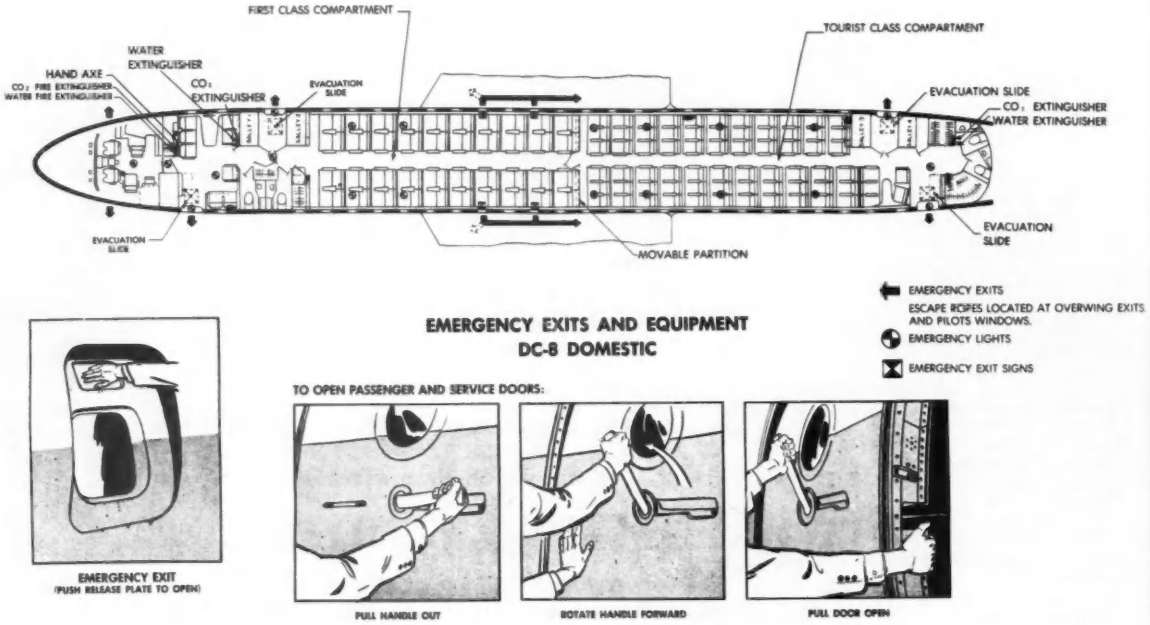
Forcible Entry

The new turbine powered (jet and turbo-prop) aircraft all have much heavier fuselage skin and structure. This is mainly due to their ability to fly at much higher altitudes which requires greater pressurization of the fuselage. Most designs



United Air Lines Photo

Figure 1. The DC-8 Jet Mainliner. On coast-to-coast flights its capacity is 109 passengers and 12,000 pounds of airmail, express and freight.



DOORS The doors in the pressurized area of the DC-8 fuselage are all plug-type doors or inward-outward opening doors. The passenger entrance doors located on the left side, and two galley service doors located on the right side of the fuselage are approximately 14 feet from the ground with gear down, and provide a means of exit for passengers and crew. Each of these doors is hinged along the forward edge and first opens inward—As it does so, the forward edge pivots inboard to let the aft edge clear the door jamb, and allow free movement for the door to then swing outward to the open position. An automatic hold-open mechanism is installed on each door.

The door is opened by turning the handle in a clockwise direction. The door will swing inward and tilt to swing outward through the door opening and will latch in the open position.

EXITS Four emergency plug-type exits are located in the over-the-wing windowbelt area of the fuselage. Each exit hatch is provided with a single-point latching mechanism. The hatches are not hinged but rest in retainers located in the bottom inboard portion of each jamb. The exit is opened by a force of 20 lbs. on the plate in upper part of door. Push in on plate and door falls inward.

Figure 2

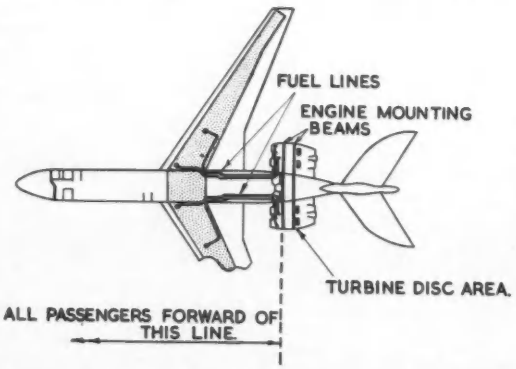
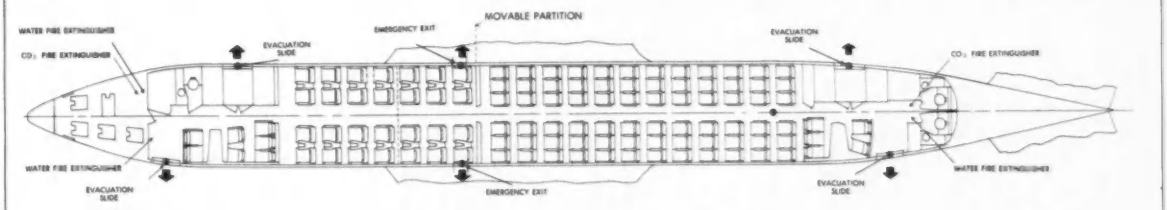


Figure 3. The arrangement of the rear-mounted engines on the proposed Vickers V.C.10 design. The Sud Aviation "Caravelle" now in service has these rear-mounted engines.

have also incorporated "rip stoppers" which prevent a minor rip or break in the fuselage skin from expanding greatly and causing explosive depressurization of the cabin.

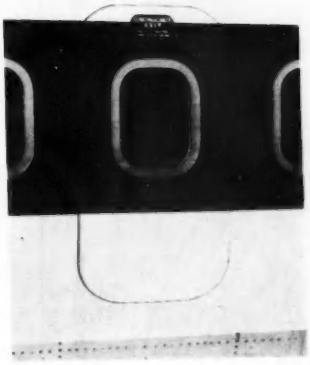
Due to this heavier construction, it is now almost impossible to use hand tools to force entry into the fuselage during a rescue operation. The only practical method of entry, other than the normal or emergency exits, is through the use of portable power tools.

These tools may take the form of electrically or pneumatically powered

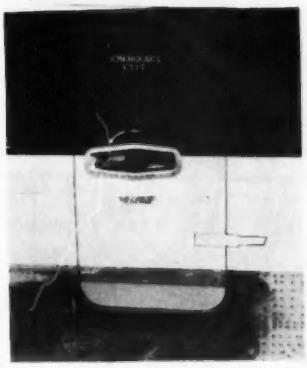


EMERGENCY EXITS AND EQUIPMENT
BOEING 720

Figure 4



PUSH EXIT IN AND LIFT UP TO OPEN
PUSH IN ON PLATE TO UNLOCK



1 PULL HANDLE
2 ROTATE IN DIRECTION OF ARROW
3 PULL OUT

saws or portable hydraulic jacks*.

In using a saw, care should be taken to select an area for forcible entry which would offer the least resistance. Heavy structural members in the vicinity of the aircraft floor line and in the hat rack area could offer serious resistance to a forcible entry attempt, even though using proper power tools. Another factor to be taken into consideration is that the fuselage section above the seat level (hat rack) and at the floor line is used for oxygen piping, electrical cables, etc., which, if advertently severed, could result in a hazard to the operator or seriously increase the fire or ignition potential. Jet aircraft with rear mounted turbine engines may have fuel lines aft of the swept back wings to the powerplants as illustrated in Figure 3.

Most turbine aircraft will not have chop marks. The

*The NFPA Sectional Committee on Aircraft Rescue and Fire Fighting has not, to date, been able to find totally acceptable power tools for forcible entry purposes which it can recommend unqualifiedly for this service.

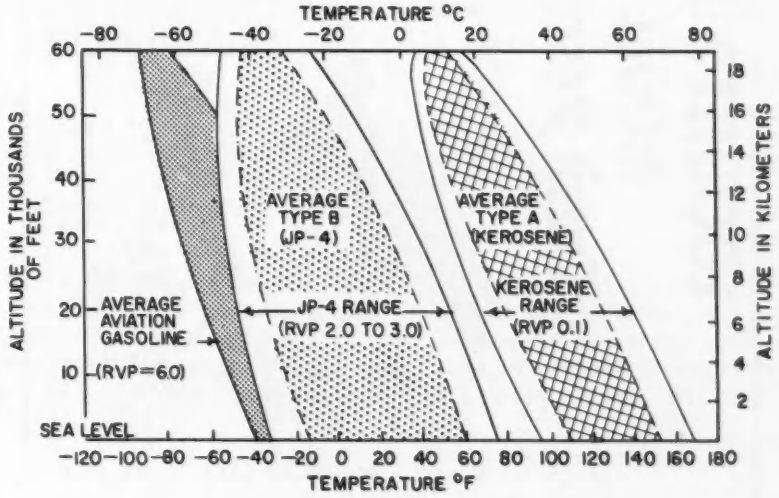

TEMPERATURE °C
-80 -60 -40 -20 0 20 40 60 80
ALTITUDE IN THOUSANDS OF FEET
60 50 40 30 20 10
ALTITUDE IN KILOMETERS
18 16 14 12 10 8 6 4 2
AVERAGE TYPE B (JP-4)
AVERAGE TYPE A (KEROSENE)
AVERAGE AVIATION GASOLINE (RVP=6.0)
JP-4 RANGE (RVP 2.0 TO 3.0)
KEROSENE RANGE (RVP 0.1)
SEA LEVEL
-120 -100 -80 -60 -40 -20 0 20 40 60 80 100 120 140 160 180
TEMPERATURE °F

Figure 5 →
Change of Vapor Flammability Temperature Limits with Altitude

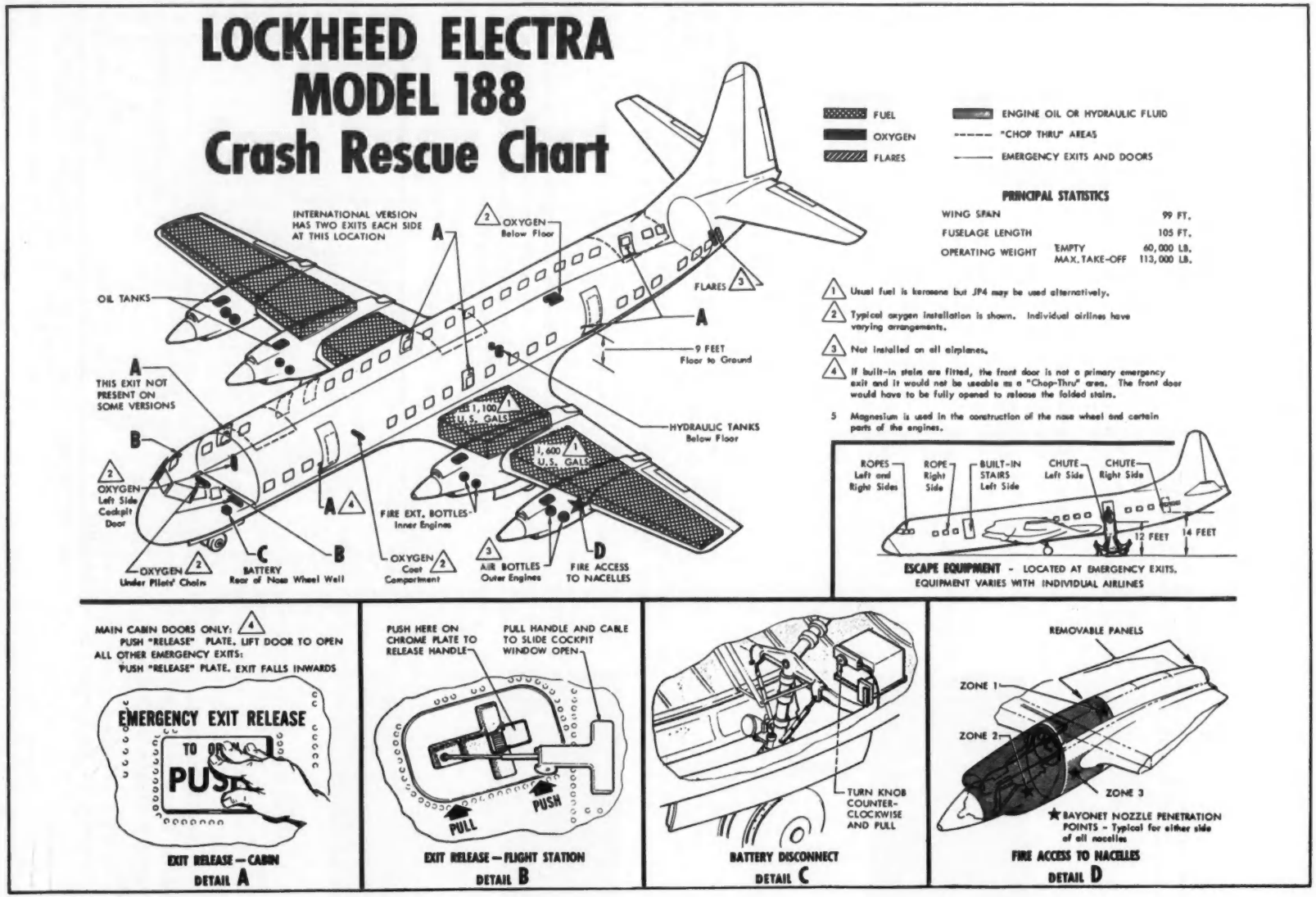

LOCKHEED ELECTRA
MODEL 188
Crash Rescue Chart
FUEL
OXYGEN
FLARES
ENGINE OIL OR HYDRAULIC FLUID
"CHOP THRU" AREAS
EMERGENCY EXITS AND DOORS
PRINCIPAL STATISTICS
WING SPAN 99 FT.
FUSELAGE LENGTH 105 FT.
OPERATING WEIGHT EMPTY 60,000 LB.
MAX. TAKE-OFF 113,000 LB.
1 Usual fuel is kerosene but JP4 may be used alternatively.
2 Typical oxygen installation is shown. Individual airlines have varying arrangements.
3 Not installed on all airplanes.
4 If built-in stairs are fitted, the front door is not a primary emergency exit and it would not be useable as a "Chop-Thru" area. The front door would have to be fully opened to release the folded stairs.
5 Magnesium is used in the construction of the nose wheel and certain parts of the engines.
INTERNATIONAL VERSION HAS TWO EXITS EACH SIDE AT THIS LOCATION
OXYGEN Below Floor
FLARES
OIL TANKS
9 FEET Floor to Ground
THIS EXIT NOT PRESENT ON SOME VERSIONS
HYDRAULIC TANKS Below Floor
OXYGEN Left Side Cockpit Door
FIRE EXT. BOTTLES Inner Engines
OXYGEN Under Pilots' Chairs
BATTERY Rear of Nose Wheel Well
OXYGEN Coat Compartment
AIR BOTTLES Outer Engines
FIRE ACCESS TO NACELLES
ROPES Left and Right Sides
ROPE Right Side
BUILT-IN STAIRS Left Side
CHUTE Left Side
CHUTE Right Side
12 FEET
14 FEET
ESCAPE EQUIPMENT - LOCATED AT EMERGENCY EXITS. EQUIPMENT VARIES WITH INDIVIDUAL AIRLINES
MAIN CABIN DOORS ONLY:
PUSH "RELEASE" PLATE. LIFT DOOR TO OPEN
ALL OTHER EMERGENCY EXITS:
PUSH "RELEASE" PLATE. EXIT FALLS INWARDS
EMERGENCY EXIT RELEASE
TO OPEN
PUSH
EXIT RELEASE — CABIN
DETAIL A
PUSH HERE ON CHROME PLATE TO RELEASE HANDLE
PULL HANDLE AND CABLE TO SLIDE COCKPIT WINDOW OPEN
PULL
PUSH
EXIT RELEASE — FLIGHT STATION
DETAIL B
TURN KNOB COUNTER-CLOCKWISE AND PULL
BATTERY DISCONNECT
DETAIL C
REMOVABLE PANELS
ZONE 1
ZONE 2
ZONE 3
★ BAYONET NOZZLE PENETRATION POINTS - Typical for either side of all nacelles
FIRE ACCESS TO NACELLES
DETAIL D

Figure 6

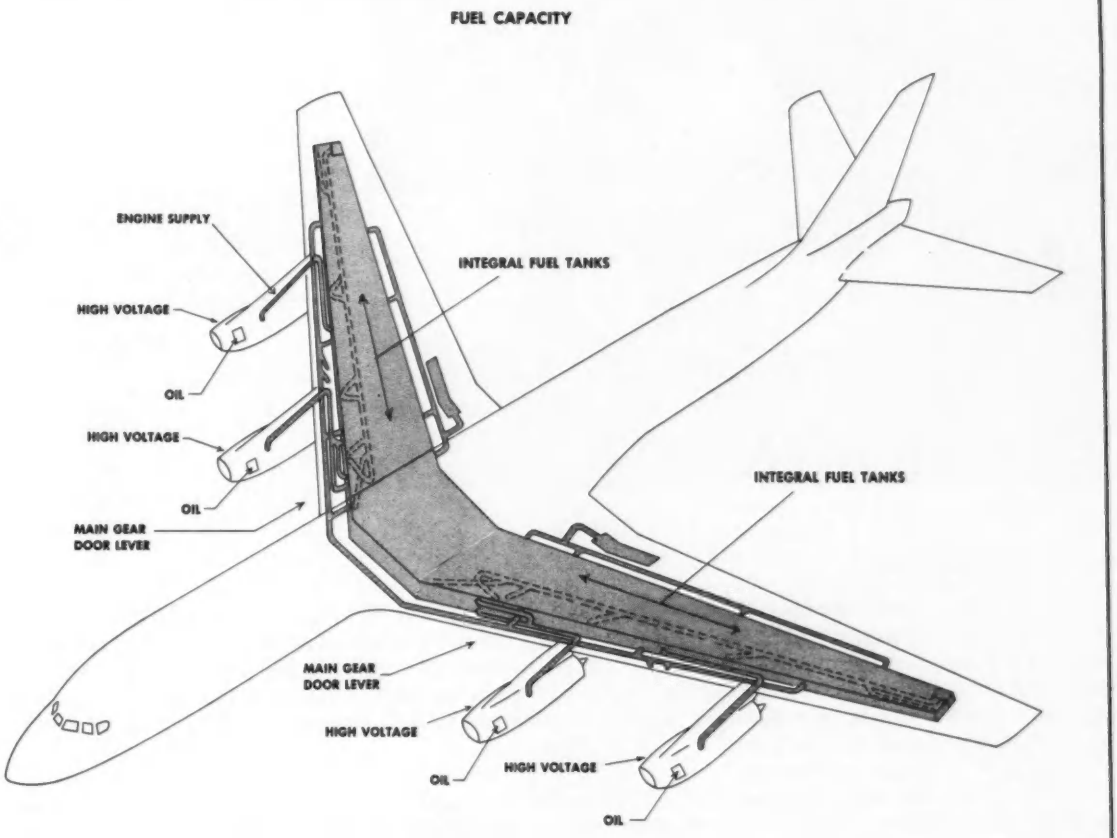


Figure 7

emergency exit doors can sometimes be forced open if jammed by a heavy blow with a hammer on the latch which would break the latches and allow the door to fall inward.

Fuels

Two basic types of fuels are used in modern turbine aircraft in commercial service. Type A means all types of kerosene grade fuels and have the same general fire hazard characteristics as ordinary kerosene. JP-5 and JP-6 are grades of Type A fuel as used by U.S. Military forces. Other names and designations may be used for Type A fuels, however their general hazards are the same.

Type B fuel means a blend of gasoline and kerosene with the same general fire hazard characteristics as gasoline. Due to the low vapor pressure of Type B fuel however, the vapor/air mixture above the liquid surface in a tank will most frequently be in the flammable range under normal temperature and pressure conditions. This is opposed to kerosene which would be normally too lean and gasoline too rich. JP-4 is a military designation for a Type B fuel.

Additional information on both types of fuel is contained in NFPA 413-M.

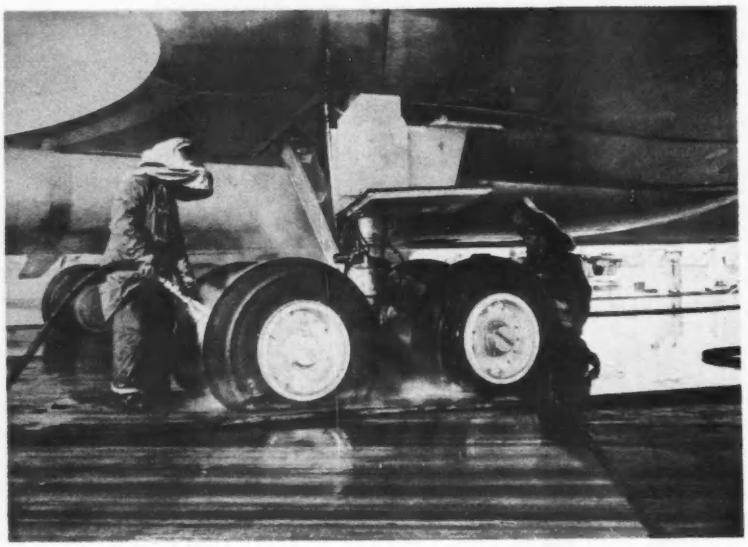


Figure 8. Following a maximum-effort braking stop, the tires have deflated after the fusible plugs have melted and firemen are cooling the brakes and wheels with water fog. Note their approach to the landing-gear truck from foreward and aft.

Electrical Problems

The primary electrical system on some turbine powered aircraft is 115/200 V 3 phase 400 cycle AC. However, this system would only be activated with engines running or with a ground power unit connected. The ignition system on each engine will carry 4000 V and chopping or cutting into the engine pod could mean instant electrocution. The ignition system normally is only activated during engine start up, however it could be activated at any other time.

Other of the new turbine powered aircraft use 120 - 128 volt DC as their primary electrical service. Since this voltage can be supplied by the aircraft batteries, it would not be necessary to have an engine running or ground power connected for this wiring to be energized.

Wheel and Brake Fires

The wheel and brake fire and explosion problem in most modern turbine powered aircraft has been reduced through the use of fire resistant hydraulic fluid in the braking system and fusible plugs in the wheels. Some types of aircraft and some operators may still elect to use a flammable mineral type hydraulic fluid in brake systems, however this would be in a minority of cases.

A small amount (4 to 5 gallons) of mineral type hydraulic fluid is contained in the shock absorber (oleo) strut of the landing gear. In the event of broken seals or other leaks, this fluid could be expected to contribute to the intensity of a brake or wheel fire.

Most of the new jet transports (not necessarily true of turbo-props) are fitted with fusible plugs in the wheels to prevent a wheel explosion. When the temperature of the wheel reaches a predetermined point, the fusible plug will melt, deflating the tire. In the event that brake overheating occurs, without actual fire, the best course of action is to let the brakes cool down by themselves, without the application of any cooling agent. If a fire in the brake and wheel assembly does occur, dry chemical should be used to extinguish it. Due to the possibility of "spot" cooling setting up internal stresses in metal of the wheel and subsequent damage, the use of CO_2 as an extinguishing agent should be avoided. If it is necessary to use CO_2 , the applicator or horn should be held far

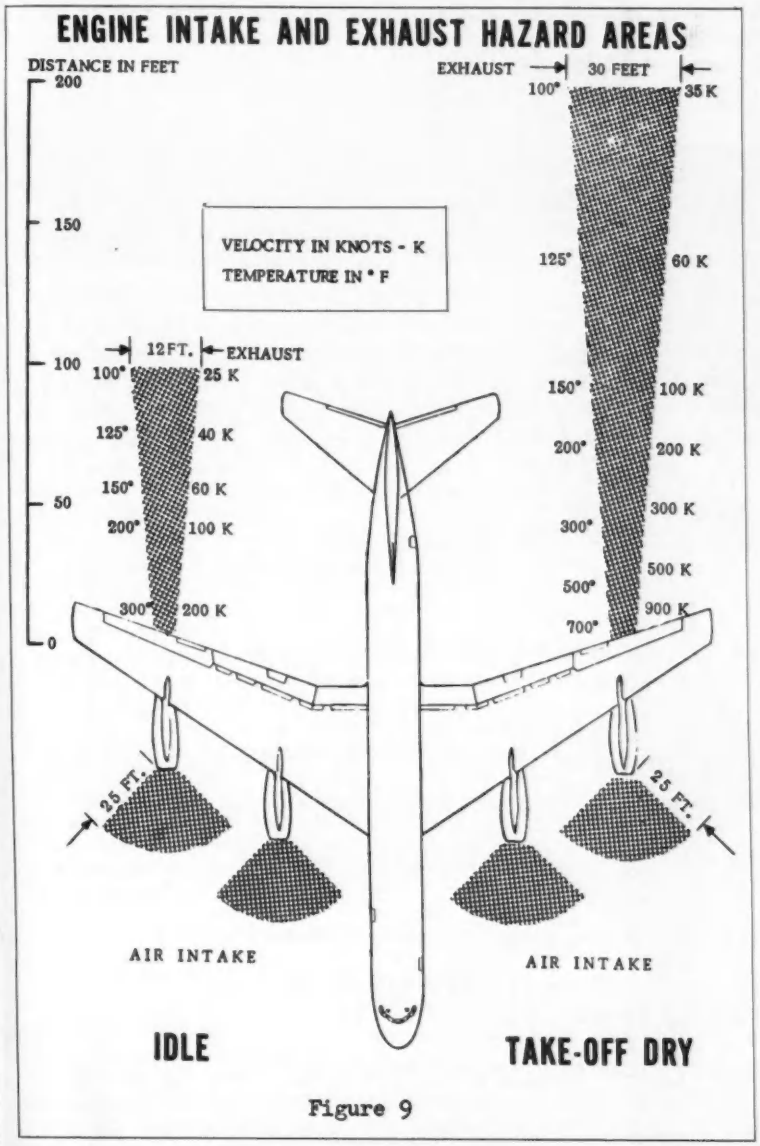


Figure 9

enough away from the wheel to avoid a build-up of "snow" on the wheel or brake.

If dry chemical or CO_2 are not available, or fail to extinguish the fire, coarse water spray or foam may be used.

Engine Fires

Two basic types of fires can be expected to be encountered in turbine engines, one in the accessory section, the other in the tailpipe.

Due to the hazard from the jet intake and exhaust blast (see last paragraph) APPROACH A JET AIRPLANE WITH EXTREME CAUTION UNLESS ALL ENGINES HAVE BEEN SHUT DOWN.

Anytime an engine is being started or is running, a fire may develop in the accessory section as the result of fuel or oil leaks, or an electrical short.

If the cowling is open, the evidence of fire will be immediately visible. If the cowling is shut, the only evidence will be a fire warning in the cockpit or smoke or burning liquid being emitted from the cowling.

When controlling an accessory section fire with the use of ground fire fighting equipment, the use of CO_2 is preferred. When the cowling is open, the agent may be discharged directly on the area involved. With the cowling closed, a small door is provided in the cowling which can be pushed open by the CO_2 applicator, and the agent injected into the accessory spaces. Most installed turbine engine fire protection systems use bromotrifluoromethane as the extinguishing medium which may be actuated from the cockpit.

The use of dry chemical, foam or water in fighting an engine fire or its component parts (as in the accessory section) will result in the need to change the engine, to clean-out extinguishing agent residues, and to check for possible other damage.

The tailpipe fire presents different problems. In this case, dry chemical is the preferred agent. Most fires of this type will be extinguished by the crew shutting off the fuel supply to the engine, while continuing to turn the engine over with the starter. If this procedure fails, inject dry chemical into the tailpipe to secure extinguishment. If it is necessary to use CO_2, avoid inserting the nozzle into the tailpipe to prevent "spot" cooling and subsequent damage.

Sometimes a pool fire will develop behind the malfunctioning engine as a result of raw fuel being discharged from the tailpipe onto the ground. This type of fire should be combated in the normal manner using dry chemical, CO_2, foam, water spray, etc.

Fuel Spills

Even though the turbine aircraft fuel at higher rates and pressures, the design of the new equipment on the aircraft and on the ground should reduce the frequency and intensity of fuel spills. Fire caused by fuel spills should be extinguished in the normal manner.

Other Problems

Major other problems are jet intake or exhaust hazards encountered from a running engine. The hazardous area in front of a running engine is considered to extend out 25 feet and in an arc of 45°. At idle power the blast extends 100 feet to the rear with temperatures of 100°F at this distance. (See Figure 9.)

Get These Other Useful NFPA Publications!

AB 235	Air Line Pilots Guide to Airport Fire Fighting Services and Procedures.....	.75
AB 236	Attention - All Pilots: For the Survivable Airport Crash -- Five Minutes of Protection..	.75
AB 249	There's Protection on England's Aerodromes.....	.75
AB 250	Naval Research Laboratory Studies on Foam Covered Runways.....	.50
AB 251	RCAF Fire Fighter Training.....	.25
AB 254	Protective Clothing for Aircraft Rescue and Fire Fighting Personnel.....	.25
AB 256	Proposed NFPA Guide on Foaming Runways for Crash Protection.....	.25
NFPA No. 402	Standard Operating Procedures - Aircraft Rescue and Fire Fighting.....	.35
NFPA No. 403	Aircraft Rescue and Fire Fighting Services for Airports and Heliports.....	1.00
NFPA No. 412	Test Procedures, Foam - Aircraft Rescue and Fire Fighting Vehicles.....	.50
NFPA No. 414T	Tentative Recommended Specifications for Aircraft Rescue and Fire Fighting Vehicles.....	.50

Wolfville, Nova Scotia, Fire Department

THE volunteer fire department in Wolfville, Nova Scotia, an NFPA member fire department headed by Chief Harry VanZoost, early this year accepted delivery of a new pumper and a new emergency truck. Built on an International chassis by Pierre Thibault of Canada, Ltd., the pumper has 625 Imperial gpm capacity, a 500 gallon water tank, and carries a portable pump and two thousand feet of hose with twin electrically operated booster reels.

The Emergency unit is a panel truck built on an International chassis with four-wheel drive and a front-mounted winch. It has seating space for six men and carries resuscitators, self-contained breathing apparatus and a variety of emergency and rescue equipment. The unit may also be used as an ambulance. It was purchased with fire department funds, and all the equipment was mounted on the truck by members in their spare time.

In addition to the new units the Wolfville Fire Department has a "quad," a trailer pump and a trailer-mounted lighting plant. All apparatus is radio-equipped and tuned into the West Nova Scotia Mutual Aid System frequency. The fire department serves a town population of 2,500 and rural areas of eastern King's County.

New Uniforms in Milwaukee

(*Continued from page 18*)

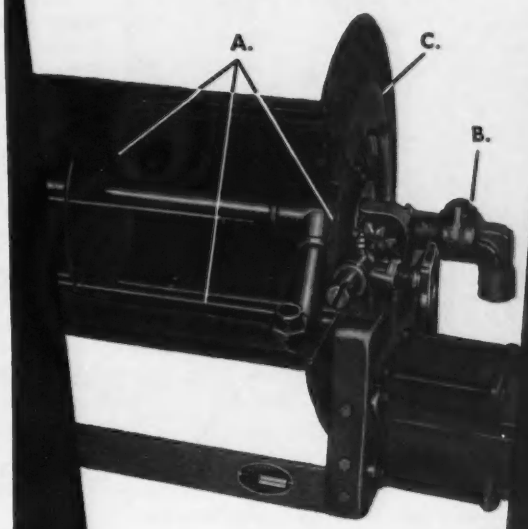
officers of the department now wear the white caps during the summer months.

In the early summer of 1960 a delegation representing the department's fire inspectors appeared before the Personnel Committee to request consideration of a short-sleeved, open collar uniform shirt for summer wear by members of the Bureau of Fire Prevention and Investigation. The committee, mindful of the fact that inspections are carried on in many types of buildings and areas and under all conditions, recommended adoption. The summer of 1960 for the first time saw Milwaukee's fire inspectors performing their duties comfortably and efficiently in short sleeves.

A gratifying response to the new uniform has been noted and no deadline has been set for the required changeover. As an encouragement and inducement to members, however, space and clerical personnel have been made available at the department's training school for the display and sale of used uniform garments. It is felt that volunteer departments, particularly, may be interested in acquiring these.

To effect a satisfactory major change in the uniform requirements of a large fire department is no small achievement. The cooperation and understanding of every member was necessary, as well as the desire and need for a change.

What's Inside Counts Most



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C. Positive chain drive

Design and construction features make the big difference in hose reels, and these features make Hannay reels first choice among firemen everywhere: Tie-rod *plus* disc reinforcing provide maximum strength for maximum shock pressures. Weight of reel and hose carried on the frame, *not on the swing joint*, to insure leak-proof operation. Chain and sprocket maintain perfect alignment for flexible, positive drive.

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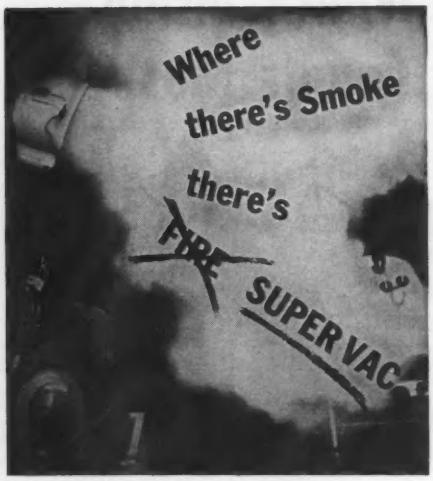

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- Now four sizes — 12" - 16" - 20" - 24".
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Place a Tone Activated receiver in your firemen's homes and have them in action at the fire scene instead of on the way. Gain those precious minutes with an instant alarm.

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(Bill Huckle Photos)

A Story Goes With It!

SHOWN above is "Wally" Gannon, former chief of the Muskegon, Michigan, Fire Department and now an instructor in the University of Michigan, Firemanship Training Department. Last summer, when he arrived in East Jordan, Michigan, to hold a regional training session, he found that the firemen in that city had recently purchased a 1916 American LaFrance hose wagon which had been converted to a 750 gpm pumper. When he came down to look at the apparatus, Chief Gannon discovered that this was the first piece of apparatus he ever drove as a member of a fire department. Forty-two years ago, in September, 1918, he joined the Muskegon Fire Department, and six months later he was promoted to driver of the above vehicle.

In 1946 he left the fire department to work for the University as an itinerant fire instructor. Seven years later, he returned to the city as fire chief. Meanwhile, the pumper had long been retired and was stored in the basement of the Central Fire Station. Subsequently, it was sold and eventually was sold again to the firemen of East Jordan, who wanted an old piece of apparatus for display and parades. Thus, after some 25 years, Chief Gannon once again found the old truck and drove it proudly down the main street of East Jordan.

Question: What is the new standard complement of ground ladders for an aerial ladder truck and what is the total number of feet of ladders carried?

Answer: See Section 9310 of NFPA Standard No. 19, Specifications for Motor Fire Apparatus, 1960 edition.

On the fireboat *"City of Portland"*, a Rockwood FOAM system with variable automatic proportioning of the fire smothering foam liquid includes Rockwood turret nozzle convertors, hose nozzles, applicators and extensions. Pumping power supplies a continuous output of 7,000 gpm. Smaller photo shows refueling on this boat with Double Strength FOAM liquid through a trough-like funnel into a 250 gallon FOAM storage tank.

Rockwood helps protect Portland

Fireboat's FOAM system provides 3600 cubic feet of fire-smothering blanket — in 3 minutes!

For up-to-the-minute protection of the harbor area of Maine's metropolis, the fireboat "*City of Portland*" carries a Rockwood FOAM system engineered for fast, effective fire fighting.

This Rockwood balanced pressure proportioning system incorporates all latest mechanical developments, including automatic control of FOAM liquid injection, variable percentage selection, individual selection of FOAM or water discharge and use of nozzles that can discharge FOAM, FogFOAM, WaterFOG or straight water streams.

The FOAM metering valves can be set for Double Strength (3%) or Regular Strength FOAM Liquid (6%). System will maintain the desired percentage automatically, regardless of pressure or flow variations. FOAM tank can be quickly refilled for maximum discharge of 82,000 gallons of expanded FOAM per tankful.

Protective advantages like these are typical of Rockwood systems and products for fire fighting vessels, vehicles or industrial hazards. Tested and Listed By Underwriters' Laboratories, Inc. For details, write to ROCKWOOD SPRINKLER COMPANY, 426 Harlow Street, Worcester 5, Massachusetts.

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A *New*, Safer Procedure for TRAINING FIREMEN!

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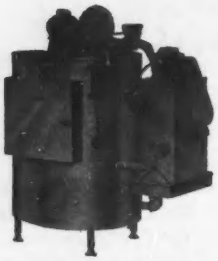

- Volume and density of smoke may be controlled at the machine, which enables instructors to predetermine and instantly control the conditions they want to simulate.
- Smoke is cool, which is less distracting to beginners. Smoke may be heated and infiltrated with sparks, flying ash, etc. as trainees progress.
- Smoke is relatively non-toxic. This is an important safety factor with trainees who have not yet achieved efficiency in respiratory protection.
- Smoke can be produced in enormous volume, enough to fill a drill tower or to simulate the worst possible basement fire.
- Operation is very economical. No auxiliary fire is required, and it burns the same waste sawdust ordinarily used for moisture absorption in salvage operations.
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Fire Marshal Martin S. Hurst

FORMER Deputy Fire Marshal of Ontario, Martin S. Hurst has been appointed to the position of fire marshal of that province to fill the vacancy created by the untimely death of the late Fire Marshal William J. Scott, Q.C., O.B.E. The new fire marshal is well known to members of the fire service in the United States and Canada. Born and educated in Toronto, he joined the Toronto Fire Department in January, 1940. Two years later, during World War II, he joined the Corps of Canadian Fire Fighters and served as a staff officer in London, England, and Ottawa. He returned to the Toronto Fire Department in December, 1945.

In 1949, Martin Hurst joined the staff of the Ontario Fire Marshal as administration officer. He was appointed to assistant deputy fire marshal in July, 1951, and to deputy fire marshal in March, 1956. He is a member of NFPA and of the Fire Marshals Association of North America, as well as other fire service associations.

New Pacific Coast Officers

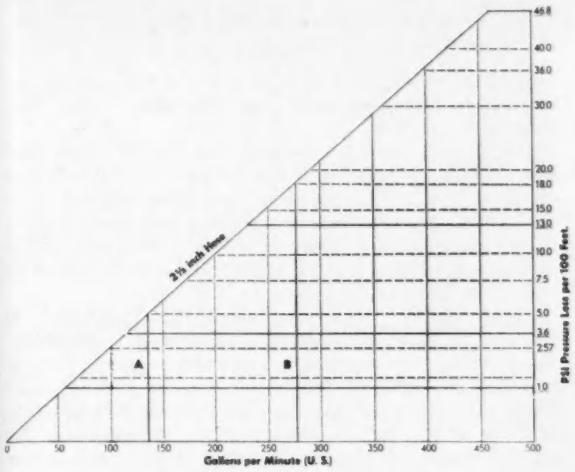
DURING the annual meeting of the Pacific Coast Inter-Mountain Association of Fire Chiefs, at Las Vegas, Nevada, the following officers were elected: Chief Harold C. Fisk, Tacoma, Washington, president; Chief John Garthe, Santa Ana, California, first vice president; Chief Harold H. Dean, Phoenix, Arizona, second vice president, and S. H. Edmondson, Pasadena, California, secretary-treasurer.

The 1961 annual meeting of this association also will be held in Las Vegas, in conjunction with the meeting of the International Association of Fire Chiefs, during the week starting September 25, 1961.

New AEC Film

RECENTLY a 14-minute motion picture in full color was made by the AEC Fire Department at the National Reactor Test Station, Idaho Falls, Idaho. It shows procedures for fighting fires involving radioactive materials. Prints of the films can be obtained from various film libraries of the Atomic Energy Commission.

To obtain the location of the AEC film library serving your area, write Francis L. Brannigan, Safety and Fire Protection Branch, Office of Health and Safety, U.S. AEC, Washington 25, D. C.



Flows in 2½-inch Hose

Here's a new type of chart showing flows and pressure losses in 2½-in. rubber-lined fire hose. It may be noted that all information is presented in a straight line graph rather than a "curve."

This chart is based upon log 3.6. That is, each time the flow is doubled, the pressure loss per 100 feet is multiplied by 3.6. Each time flow is cut in half, pressure loss per 100 feet is divided by 3.6. For example, with 137 gpm flowing (Line A) we have 5 psi pressure loss. Double the flow to get 274 gpm (Line B) and the pressure loss increases to 18 psi per 100 feet (5 x 3.6 = 18).

It may also be noted from this example that Line A, on the diagram, is half the height of Line B. Thus we observe that, with any flow, half the vertical distance from the hypotenuse toward the base line will give the pressure loss at half the flow.

With this chart it is also very easy to determine pressure losses when flows are known and flows where pressure losses are known. For example, the horizontal line indicating 10 psi pressure loss intersects the hypotenuse at the vertical line indicating 200 gpm.

Pressure losses from flows of other sizes of hose also vary by 3.6 so that similar charts can be made for 1-in., 1½-in., or 3-in. hose. In making such charts, the horizontal solid lines are based upon a scale that doubles the vertical distance when the pressure loss is multiplied by 3.6. For example, the interval from 3.6 to 13.0 is twice the distance from 1.0 to 3.6. From 13.0 to 46.8 is twice the interval from 3.6 to 13.0. But in each case the pressure loss is actually increased by 3.6 when the interval is doubled.

Giant Message in Racine

Chief Rudolph E. Anderson, of the Racine, Wisconsin, Fire Department, has forwarded this photo taken during Fire Prevention Week in his city. It shows 1,600 pupils of the Mitchell Junior High School in formation to spell a fire prevention message. The picture was taken by a Racine *Journal-Times* photographer from the top of a 100-foot aerial ladder.

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500 Gallon Tank

How to Identify Fire Causes

(*Continued from page 17*)

having been located at this spot. Foam rubber does not run much, but burns with great intensity on the floor directly beneath it.

Occasionally, asphalt roofing material will melt and burn in heavy, blob-design on the floor; but this is rare since, in most fires, the floor has been covered with ashes and plaster before the roofing has been burned to the extent that it drops in. This roofing material is not very fluid, and when it is involved usually burns on top of the debris on the floor.

When gasoline or similar material is suspected on porches or buildings without basements — especially those with single-constructed flooring — check the soil beneath the area of suspected gasoline burns. The liquid often runs through the floor into the dirt beneath. Dig one or two inches into the earth and smell for the odor of flammable liquids. A vapor tester is still better for this purpose since some flammable liquids, like alcohol, have little odor in cold, wet earth. If your department does not have one, the local gas company usually does. However, it should be checked since it may be designed to indicate one specific gas, such as natural gas. Flammable liquids will also be absorbed by sawdust, bricks, concrete and similar porous materials. If the absorbent material is slightly damp when the flammable liquids contact it, and is then further wetted by the fire streams, the liquid is sealed in and the vaporizing is retarded, even though the surface of the material has been burning for some time. Vapors have been found in bricks and earth as much as five days after a flammable liquid fire.

Spots of candle wax may be found below or near the point of origin. The heat-melted wax will drop or run to a lower and perhaps cooler level where it may not burn, or at any rate will burn on the surface only. It will often last out a surprisingly long fire without being entirely consumed.

There are undoubtedly numerous other commonly involved materials with combustion characteristics indicating the intensity and duration of fire, the manner of burning and, to varying degrees, the cause of the fire. More research and education in this direction would surely be of great assistance to fire investigation.

In summary, the following is a fairly effective rule-of-thumb guide for the investigation for fire cause:

Reconstruct as much as possible.
Determine path of heat travel and point of origin
Establish approximate burning time.
Evaluate combustion characteristics of materials involved.
Compare similar materials and situations, where possible.
Fit known facts to various possibilities.
Corroborate with information from occupants and neighbors as to activities prior to fire.

Yearbook of Agriculture

THE 1960 Yearbook of Agriculture, prepared by the U. S. Department of Agriculture, 480 pages, including 90 pages of illustrations, is entitled "Power to Produce." It is an extremely interesting and readable account of the history and development of farm equipment, machinery and buildings from pioneer days up to 1960. Fire personnel interested in rural fire protection as well as in the development of automotive and power equipment should find the publication of interest. Copies are available at $2.25 each from the Superintendent of Documents, Washington 25, D. C.

Bare roadsides like this prevent danger of fires caused by ignition of dead vegetation by exhaust sparks or tossed cigarettes. Agricultural Commissioner Hardy inspects treated roadside.

Herbicides for Weed Control

A NUISANCE for many fire departments, particularly those in rural areas, is the roadside fire, sometimes caused by a cigarette tossed from a passing automobile. These fires not only call for the response of man power and equipment but also sometimes spread to farm property, buildings or timber creating a major fire control problem.

One way to minimize such fires is to eliminate one of the factors that lead to fire; that is, the growth of vegetation along the sides of the road or highway. For the past year, this has been attempted in Yolo County, California, and we have received the following statement from Assistant Fire Chief Carl F. Theile of the Springlake Fire District in Woodland, California:

"We used to have as many as six roadside fires a day, but we haven't had *one* since 1959, when our County started a new roadside weed control program. We found that it's a lot less costly to spray herbicides than to go out and put out fires.

"The program developed by our agricultural commissioner, Charles H. Hardy, and his deputy, Herbert W. Chandler, is a simple one-two punch: in the fall, between October and December, 3.8 pounds of Simazine 80W (in 100 gallons of water) per acre are applied. This solution is sprayed along a 4-foot to 16-foot strip between the bar pit (grader line) and the fence. This is followed up with a spring application of 2,4-D at the rate of 2 quarts of Weedone 638 (in 100 gallons of water) per acre, to get the perennial weeds. Spot treatments are used at times to apply Dalapon in certain specific, localized areas.

Total cost: only $21 per roadside mile.

"One important feature of this simple program is that the herbicide kills annual broadleaf weeds and grasses *while they are germinating* all during the year. This prevents weeds from developing to cause a roadside fire hazard. This herbicide is also safe to people and to adjacent vegetation.

"We estimate that most of the roadside fires are caused by exhaust sparks and carelessly tossed lighted cigarettes igniting dead growth. By practically eliminating such growth we have eliminated these fires."

By eliminating such vegetation, a problem of erosion may be created, and fire departments should check with the local representatives of the Agricultural Department before proceeding with such an extensive weed control program.

WANT HELP IN PLANNING YOUR EMERGENCY RESCUE UNIT?

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(LEATHER)
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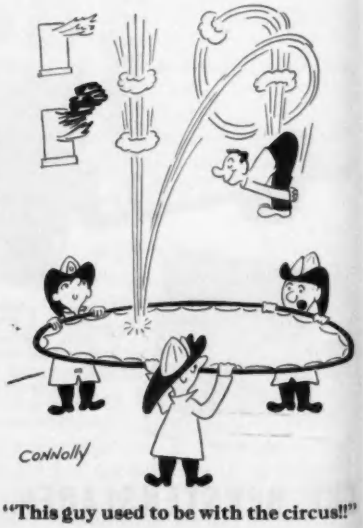
Watch That Leg Lock!

IN BASIC training, all fire fighters quickly learn how to get a secure position on a ladder by a proper leg lock. This permits free movement of the hands and arms for passing a line up the ladder, wielding a nozzle or helping in the rescue of a person.

Captain John P. Townley, Chief Inspector, Bureau of Fire Prevention, Plainfield, New Jersey, in a recent fire report to NFPA, called attention to another benefit of the leg lock. Fireman Domenick Dellaventura of that department, during a small fire, was standing on a ground ladder directing a hose stream into a window from a 1½-inch line. Suddenly, the ladder slipped and Fireman Dellaventura rode with it approximately 20 feet to the ground. His leg lock on the ladder prevented him from falling or jumping off, but although he was shaken up, he suffered no injury.

Indiana Training

PROFESSOR Shelby Gallien, Director, Public Safety Institute, Purdue University, Lafayette, Indiana, has announced courses which are scheduled for the next calendar year. In 1961 a Fire Instructors' Course will be held January 16–20; a Fire Administration Course, February 7–9; the Industrial Fire Seminar, April 4–6; the Arson Investigation Seminar, April 24–28; the Basic Fire School, May 15–19; the Rescue Training Course, June 6–8; the Indiana State Fire School, September 13–16, and the Fire Inspectors' Seminar, October 30–November 3.



"This guy used to be with the circus!!"

YOUR "PUMPER" AND ITS CARE

by Henry A. Zimmerman, M.D., Director of Cardiovascular Section,
St. Vincent Charity Hospital, Cleveland, Ohio

(From Tulsa, Fire Department News Letter)

NO ENGINEER has been able to construct a pump that even begins to equal the human heart. The average male human heart weighs approximately 350 grams or ¾ of a pound. The stroke volume is equal to 65 cubic centimeters or 2 ounces. The rate is 70 to 100 beats per minute; at an average of 80 beats per minute the output of the pump at rest per minute is 5,000 cubic centimeters or 1¼ gallons per minute. The output of the pump under load can go as high as 40,000 cubic centimeters or 10 gallons per minute.

At rest, the heart pumps 75 gallons per hour; in a day or 24 hours, 1,800 gallons. In a year, the heart at rest would pump 657,000 gallons, or enough blood to fill 65 railroad cars. Taking the average male who now lives to be 65 years of age, the heart would pump in this span the astronomical amount of 42,705,000 gallons.

This small pump is divided into a low pressure pump, the right side, which pushes the blood through the lungs where it is purified and takes on oxygen, the fuel of the body. It returns by pipe lines to the left side of the heart or the high pressure pump, which propels the oxygenated blood over the maze of pipe lines, the arteries, to every cell of the human body.

Each side of the heart has a set of two valves, and just above the aortic valve the first two vessels to arise from the central pipe line, or aorta, are coronary arteries which are the fuel lines to the heart and provide the heart with oxygen and nutrition. The heart needs about 240 cubic centimeters or ½ pint of the total cardiac output per minute for its work.

One can see from the above description the tremendous importance of maintenance of such a vital system, since disease of the cardiovascular system is the leading cause of death in the United States.

In evaluating the heart, the cardiologist, or pump man, uses the blood pressure, which tells the pressure the pump is working under; the stethoscope, which allows him to evaluate the rate and rhythm of the heart as well as to tell the status of the valves and whether they are leaking. The six-foot X ray of the chest allows him to accurately tell the size of the heart; the ophthalmoscope allows him to see the arteries in the back of the eye, and to judge whether they are normal or not. This is the only place in the human body that blood vessels can be seen.

Finally, the electrocardiogram gives him an electrical picture of the heart muscle. This also, for an accurate appraisal of the heart, must be recorded with the pump under load, or an exercise tolerance E.K.G. A blood cholesterol level has value in predicting prearteriosclerosis. These, plus a careful history of points involving the cardiovascular system (the heart and blood vessels), give a very complete picture of the heart.

The above should be the minimum requirements in evaluating the heart of a candidate to become a fireman

(Continued on page 36)

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Compact, portable Kohler electric plants deliver the quick starting, always dependable power you need for floodlights, resuscitators, smoke eradicators, iron lungs, power tools.

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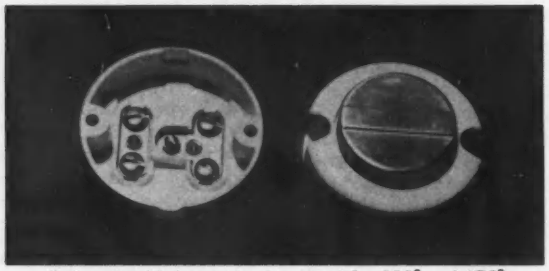
MODEL F



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Many schools, nursing homes and residences are being equipped with Automatic Fire Alarm Systems so that an early warning will be given in case fire should occur.

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THE GLOBE MAN, Pittsfield, N. H.

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WRITE FOR ILLUSTRATED, COLORED CATALOG ON FIREMEN'S SUITS & ACCESSORIES

Your Pumper and Its Care

(Continued from page 35)

and should be a part of the yearly examination of all firemen, so that early disease or deviation from the normal could be detected and early and adequate preventive treatment carried out.

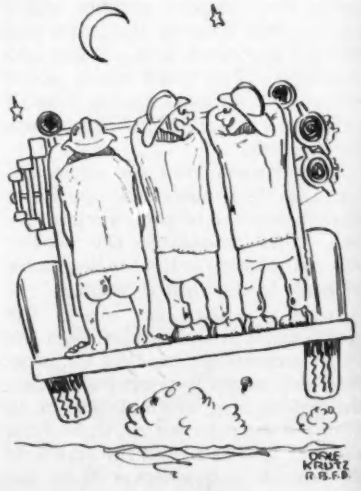
How does one go about keeping the pump in good working order? Sleep 8 hours a day, work 8 hours a day and play 8 hours a day. Avoid worry. Get some planned exercise every day, such as walking 2 to 3 miles a day. Every firehouse should have a well-equipped gym to allow for daily conditioning.

If you must: moderation in smoking (not over ½ pack of cigarettes per day or 2 to 3 cigars); drinking in moderation (1 or 2 beers or 1 or 2 highballs per day); sex is here to stay; avoid the ingestion of large amounts of fats such as ice cream, butter, milk, fat on meats, using instead unsaturated fats such as corn oil.

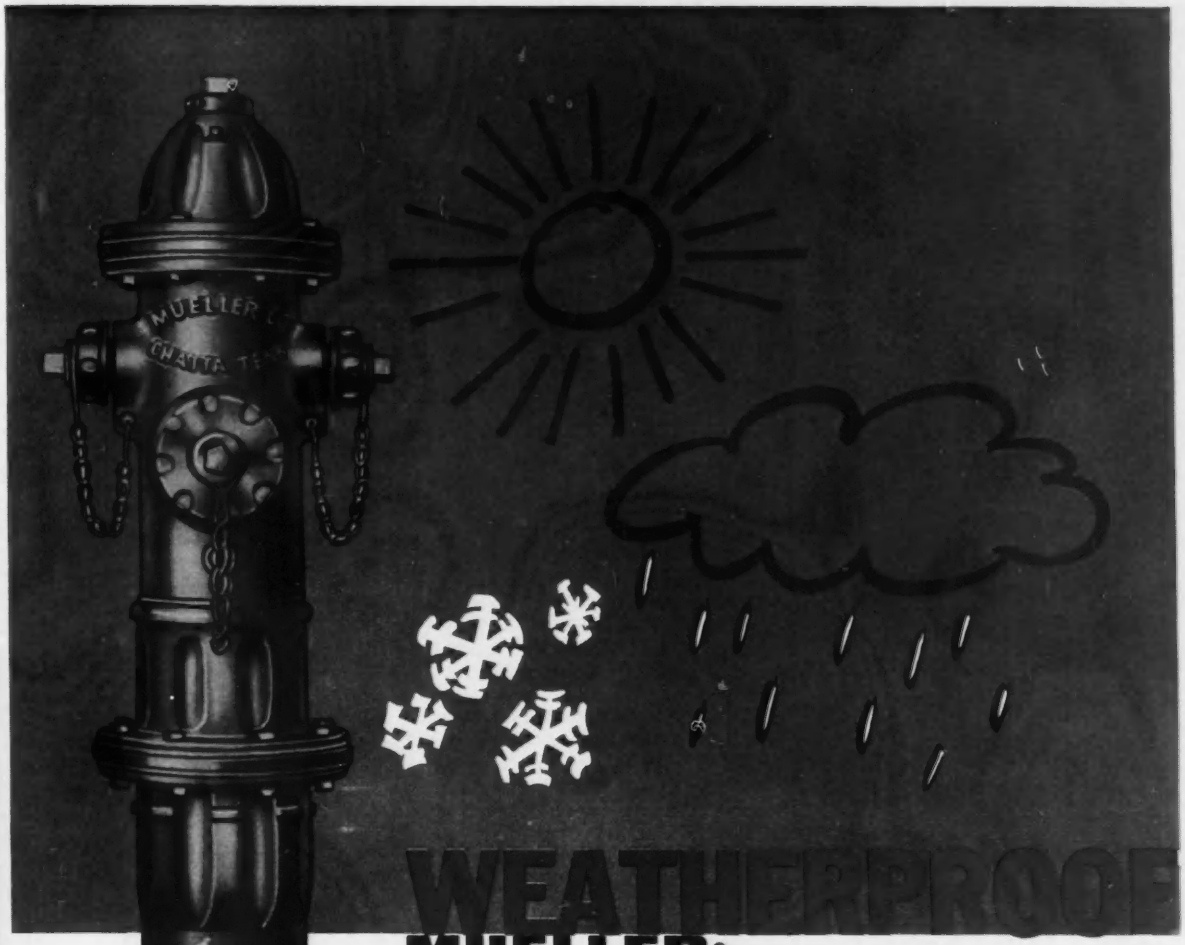
Keep weight down to ideal predicted weight; every pound over this ideal figure pushes you toward the graveyard at an accelerated pace.

The occupation of fire fighter has much potential for abnormal loading of the cardiovascular system from the time of the alert bell to proceeding to the fire, and finally to the fighting of the fire with large expenditure of energy and, at times, lack of oxygen and extreme temperature changes. All give abnormal stress to the vascular system.

A research study is now under way in the Cleveland Fire Department to determine the stress and strain to the cardiovascular system of the fireman.



"Should we wake him up now and tell him?"



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BRANCHES IN PRINCIPAL CITIES

Training in Ontario

From a report from John Corfe, Office of the Ontario Fire Marshal

(The following information arrived too late for inclusion in the November issue.)

DURING the fiscal year ending June 30, 1960, a total of 4,208 paid and volunteer fire fighters were trained in the Province of Ontario by the Ontario Fire College and the Fire Services Division of the Fire Marshal's office. The type of training varied from basic fire fighting to fire department administration for senior officers. Also included was specialized training for personnel of Ontario hospitals — 1,598 received training.

The training program in this province is divided into two general categories: 1. Advanced and specialized training of fire officers and officer candidates which is conducted by the Ontario Fire College at Gravenhurst. 2. Regional Schools and training visits under the jurisdiction of the Fire Services Division of the FMO. In addition, three Regional Schools were conducted at the Ontario Fire College and seven in the districts by the Fire Services Division. These "District Regional Schools" follow the same pattern regardless of location.

At the Ontario Fire College, 12 courses were conducted from June 1, 1959 to May 31, 1960. In this period, 321 fire officers and officer candidates were trained.

Administration Course for Senior Officers — 45 (Two Courses)
Radiological Monitoring — 51 (Two Courses)
Basic Fire Inspection Practices — 31
Company Officers' Course — 30
County Mutual Fire Aid Forum — 29
Fire Department Instructors' Course— 29
Simcoe District Regional Fire School— 22
Muskoka District Regional School—31
Volunteer Fire Officers' Course — 29
Temiskaming District Fire Course—25

The Fire Services Division of the Fire Marshal's Office trained 2,182 fire fighters through training visits and 209 fire fighters in 7 Regional Schools.

Each year, for the past 21 years, the Fire Marshal's Office has conducted the University of Toronto Fire Chiefs' Conference with an average enrolment of 125 senior officers. In April of 1960, several new topics were dealt with by provincial authorities and these included Fire Civil Defense as it applied to the newly formed Emer-

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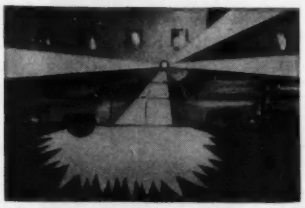

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gency Measures Organization; nuclear hazards; problems of transporting hazardous materials by truck and rail.

At the Ontario Fire College, highlight innovations were demonstrations of fighting LP-Gas fires; high-voltage electrical fires and fire involving nuclear substances. Emphasis was placed on the value of radio communications (the Fire College is fully equipped, both fixed and mobile units), and fire inspection practices.

The Ontario Fire College entered its third year of operation in 1960.

Fire Officer's Guide

DEPUTY Chief Charles W. Bahme, in charge of the Bureau of Personnel and Training of the Los Angeles, California, Fire Department, has compiled a useful new book for fire officers. Titled *Fire Officer's Guide*, it has 140 pages of tables, illustrations and data in memorandum form. It covers 122 subjects listed alphabetically from accident procedure to work schedules, and includes some essential sketches and photos to supplement the text. In addition, there are eight appendices, including such items as a table of hazardous materials and chemical index, typical markings for portable compressed gas containers, hydraulics for field use, emergency operating procedure and others.

The book was reviewed by a number of chief officers in the Los Angeles Fire Department prior to publication. It is published by Parker & Son, Inc., 241 East Fourth Street, Los Angeles 12, California. Arranged in loose-leaf form with a sturdy leatherette covering, the book is priced at $3.00 per copy (plus 12¢ sales tax in California).

Fire Service Meetings

California:

DECEMBER 16: Marin County Association of Fire Departments, monthly meeting, Woodacre. Contact W. H. Lane, secretary, 74 Vendola Drive, San Rafael.

Pennsylvania:

DECEMBER 20: Perry County Firemen's Association, regular meeting, Liverpool. Contact F. L. Fry, secretary, New Bloomfield.

Rhode Island:

DECEMBER 28: Pawtuxet Valley Firemen's League, regular meeting, Hope-Jackson Fire Co. Contact E. F. Fiske, secretary, 34 Pleasant Street, West Warwick.

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Is Ready for the "WAR PATH"!

Here's an "INDIAN FILE" about to go into action . . . every man armed with his INDIAN FIRE PUMP . . . the 5 gal. back-pack extinguisher which hacks down fire like a tomahawk cleaving a sapling.

Many INDIAN FIRE PUMPS have been in service 25 years and more. That's because they are built right by a company established in 1888 . . . built to take hard usage. *(Spare parts are quickly available.)*

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C. E. Hickey & Sons, Ltd., Hamilton

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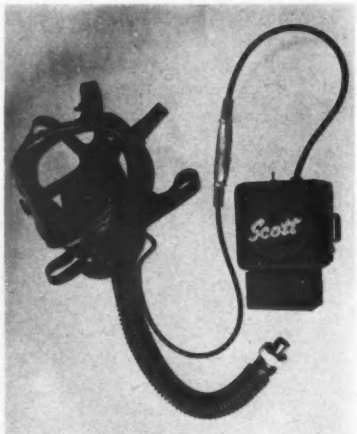

New Scott "Voice-Pak"

Firemen, chiefs and rescue squads can now communicate while wearing their Scott Air-Paks, even under very noisy conditions, with the aid of Scott's new "Voice-Pak." Completely transistorized, the unit comes with pen-light type batteries, Scottoramic mask with nosecup, breathing tube and regulator coupling. For information, write Scott Aviation Corporation, 236 Erie Street, Lancaster, New York.

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A useful, long lasting and economical tool for those grass and brush fire calls is the Ranger chemically treated fibre fire broom. Write *Perfex*, 47 Dinsmore Place, Brooklyn 8, New York. . . . Prepare now for body recovery and drowning rescues with the simplified DeGroot Drag. Drop a card to *Captain John DeGroot*, 248 Putnam Street, Peru, Illinois. . . . *Consolidated General Products Inc.*, Houston 8, Texas, announces a new, improved Gen-O-Drive overdrive that increases output level of automotive generators at low speeds. Write for complete literature.

Detex Watchclock Corporation, 76 Varick Street, New York 13, New York, offers a free copy of its new 36-page pocket-sized property protection handbook — a helpful manual for plant managers and safety directors. . . . Raymond Minichiello, recently district communications sales manager at Wellesley, Massachusetts, has been appointed manager of mobile communications product planning for *General Electric's Communication Products Department*, Lynchburg, Virginia. . . . Would you like a free copy of the four-page, full-color insert picturing the Vigilant Hand Pumper displayed in Carnegie Museum, Pittsburgh, Pennsylvania, and run in our September issue? Write to *Mine Safety Appliances Company*, 201 North Braddock Avenue, Pittsburgh 8, Pennsylvania.

•

Listed by UL of Canada

C. E. Graham Reeves, president of Falcon Alarm Co., Inc., Summit, New Jersey, announces that Falcon automatic gas-operated fire alarms have been listed by Underwriters' Laboratories of Canada, Inc., under the inspection service.

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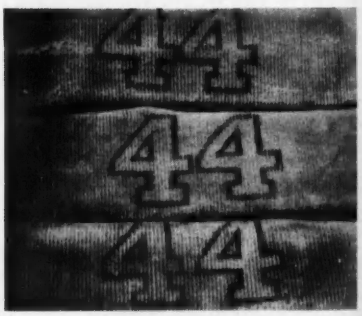

Hose Marker Decals

To quickly identify hose lengths or purchase date, W. S. Darley & Co., Chicago 12, Illinois, offers a series of 3½-inch yellow and black decals. Pictured here are decals applied to hose used on 1,022 runs involving 458 working fires with 160 pumping hours. Write supplier for details.

Vinyl Nylon Salvage Covers

A new line of 10-ounce vinyl nylon salvage covers in red, green or white, companion to Shuredry Green-Bak covers, is offered by Fulton Cotton Mills. Advantages of nylon covers for salvage work include ease of handling whether wet or dry, minimum of maintenance, and complete water resistance. The covers are flameproof and are unaffected by mildew and rot. For information, write Fulton Cotton Mills, P.O. Box 1726, Atlanta, Georgia.

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John B. Russell has been assigned as sales engineer in the state of Connecticut for *The Gamewell Company*. . . . Engineers and anyone working with figures will find the Wall Chart of Conversion Factors a most useful aid. For your free copy, write on your company letterhead to *Precision Equipment Company*, 4411 East Ravenswood Avenue, Chicago 10, Illinois.

Specially designed for classroom training is a new visual communications system which combines the use of a copying machine and an overhead projector — called Thermo-Fax. Information on this new system using transparencies is available from Department SO-409, *Minnesota Mining and Manufacturing Company*, 900 Bush Avenue, St. Paul 6, Minnesota.

Recently approved for Civil Defense purposes as internal warning devices in schools and public buildings are the portable Ferrell CD horns with trumpets. Write *CD Horn Department, Ferrell Manufacturing Company*, Groton, New York. . . . A versatile, low-cost fire tanker with high volume pump is now featured by *Baughman Manufacturing Company Inc.*, Jerseyville, Illinois. . . . A unique and colorful gift is the Firemen's Vu-Lighter with distinctive Fire Service insignia offered by *FD Products*, 90-N1 Tracey Place, Englewood, New Jersey. . . . Women's Auxiliaries can easily build up their funds by selling the firematic jewelry items made by *Hook-Fast Specialties Inc.*, P.O. Box 1425F, Providence, Rhode Island.

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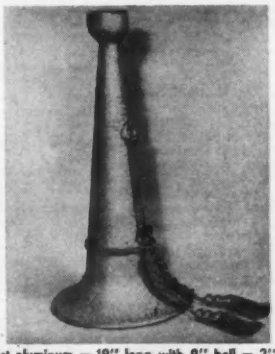

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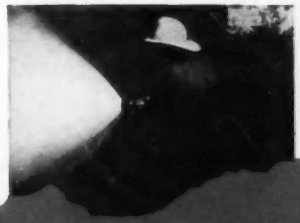

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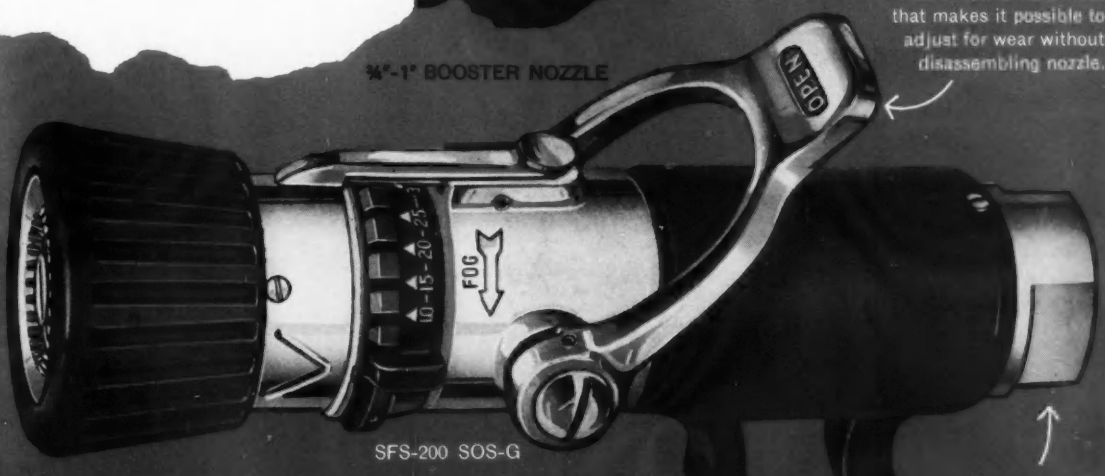

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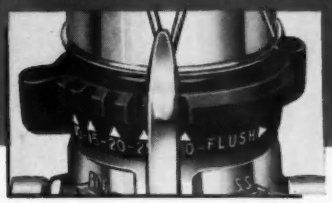

Pistol Grip available on other Elkhart Nozzles

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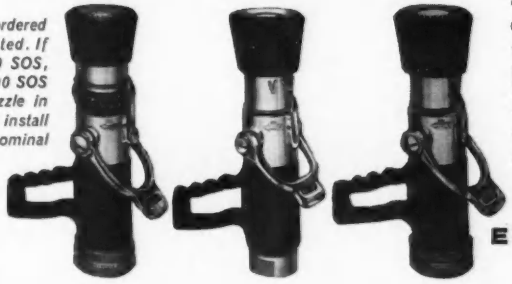

SFL-200 SOS-G | S-200 SOS-G | L-200 SOS-G

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